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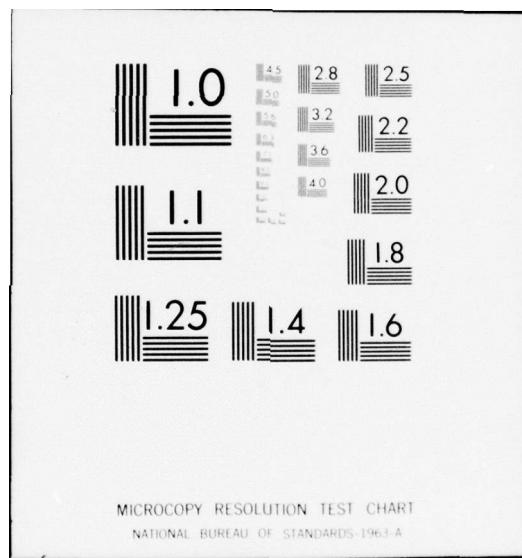
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Land Use Data

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Seafarer Site Survey Upper Michigan Region

for
U.S. Navy
Naval Electronic Systems Command
Washington, D.C.

by
EDAW inc.
under contract to
GTE Sylvania
Communication Systems Division

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The influence of natural features and the location of mining and lumbering resources have played primary roles in determining settlement locations and the shaping of land use patterns. Over 90% of the Study Area is devoted to agricultural and forests. Urbanized areas, typically widely scattered is minimal in terms of land coverage and accounts for about only 1% of the region.		
Agriculture will remain a major land use with recreation-oriented land usage likely to increase.		

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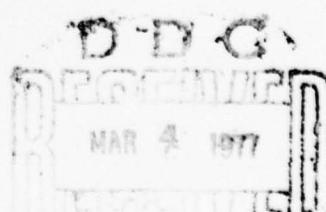
LAND USE DATA
of the
UPPER MICHIGAN REGION
PROJECT SEAFARER

for
U. S. Navy. Naval Electronic Systems Command

by
EDAW, Inc., 50 Green Street, San Francisco 94111

Under Contract to
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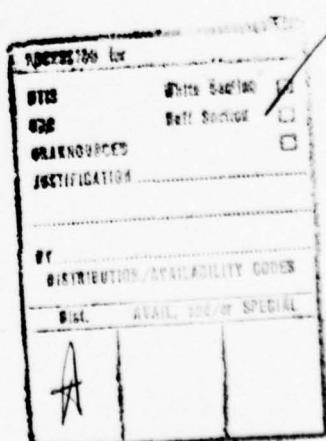


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SUMMARY

Residents in the Upper Peninsula Region today are generally descendants of immigrants attracted by the economic opportunities of past years. The French came for furs and left, but returned to harvest the pine and stayed. The Finns came to work on the iron and copper mines and found the terrain and climate so similar to their homeland that they eventually began to develop farming communities throughout the region.

Cornish, Austrians, Czechs, Poles, Slavs, Irish and Norwegians came in lesser numbers to join existing communities or form new ones. The influence of natural features and the location of mining and lumbering resources played primary roles in determining settlement locations and the shaping of land use patterns as we view them today. The Upper Peninsula area remains the rural and forested region for which it has been well known. Over 90 percent of the Study Area is devoted to agriculture and forests. Urbanized area, typically widely scattered, is minimal in terms of land coverage and accounts for about 1 percent of the region. (See Table 1.)

Although in need of some upgrading, transportation systems are fairly well developed within the Study Area, connecting all major urban centers with rural communities in outlying areas. Agriculture will likely remain a major land use. Recreation-oriented activities, although difficult to assess in scale, will likely continue to increase, with private recreation lands and developments supplementing those outdoor activities which take place on the vast publicly-owned forest acreages under Federal and State jurisdiction.

Table 1. LAND USE ACREAGE AND PERCENT OF TOTAL AREA (1)

	Total Area	Inland Water	Land Surface	Forested	Agricul.	Trans.	(2) Public Rec.	Urban	Other
Alger	597,760	18,880 3.2	578,880 96.8	535,900 89.7	25,146 4.2	8,498 1.4	1,496 .3	2,146 .4	5,694 1.
Baraga	592,402	15,488 2.6	576,914 97.4	535,100 90.3	24,952 4.1	7,152 1.2	6,995 1.2	2,715 .5	-
Delta	769,280	16,320 2	752,960 97.9	623,900 81.1	101,542 13.2	11,558 1.5	2,756 .4	7,925 1.0	5,279 .7
Dickinson	510,236	3,712 (3) .8	506,524 99.3	447,700 87.7	39,749 7.8	8,936 1.8	300 .1	9,839 1.9	-
Houghton	670,080	19,200 2.9	650,880 97	560,800 83.7	45,906 6.9	12,111 1.8	1,357 .2	14,553 2.2	16,153 2.4
Iron	780,160	30,720 2.9	749,440 96.1	696,100 89.2	27,283 3.5	9,281 1.2	3,731 .5	2,858 .4	10,187 1.3
Marquette	1,210,920	41,000 3.4	1,169,920 96.6	1,097,100 90.4	27,393 2.3	18,023 1.5	6,032 .5	14,793 1.2	6,579 .5
Menominee	698,874	3,904 .6	694,970 99.4	513,300 73.4	162,239 23.2	13,593 1.9	2,327 .3	3,511 .3	-
Grand Total	5,829,712 100%	149,224 2.6%	5,680,488 97.4%	5,009,900 85.9%	454,210 7.7%	89,152 1.5%	24,994 .5%	58,340 1.0%	43,892 .8%

(1) Definitions of terms contained in Distinctive Units and Characteristics section.

(2) Detailed information on privately owned recreation areas not available.

(3) Proposed Sturgeon River Watershed impoundments will add some 2,000 acres of surface water.

Source: Acreage figures taken from County and Regional Facts, Michigan State University, Cooperative Extension Service, 1972

EVOLUTION

Historical Setting

The Upper Peninsula Region once belonged to the Chippewa, Menominee, Ottawa and Potowatomi Indian tribes. Their bond with the land and the harmonious utilization of its resources permeated every act of their life and controlled every aspect of their culture. Before these Indian cultures, an earlier culture existed that technologically surpassed theirs by developing metallurgy based on the local copper deposits.

French missionaries and fur traders were the first Europeans to arrive in the Upper Peninsula. Furs commanded high prices and animals were abundant. The British fur companies later dominated, and when the colonies revolted the Upper Peninsula became a part of the United States.

Statehood precipitated vast changes in the Upper Peninsula Region. Copper finds of the early 19th century generated a mineral boom which expanded rapidly with iron discoveries in what are now Marquette, Iron, Dickinson and Gogebic Counties. Towns sprang up wherever major copper and iron ore bodies were located, and the mining companies, whose offices were mainly located in the eastern United States, provided transportation to the Upper Peninsula and a home in which to live.

Thousands of immigrants from Sweden, Finland and Italy arrived. Timber was now needed in quantity for charcoal to refine the ore and to support mine shaft walls. Logging areas also formed new towns. Prosperity was abundant, but by early 1900s the lumbermen began to move on, selling depleted forest landscapes to immigrant farmers or leaving the land to revert to the State as tax delinquent. Large open pit iron mines in Minnesota began to outproduce the shaft mines of the Upper Peninsula and after World War I, copper mining began to decline. Eventually the entire region felt the impact of the 1930s depression and many hard-pressed mines and businesses closed.

With the advent of the automobile, the tourist and vacation industry helped stabilize the waning economy, but only seasonally. Some industrial development occurred through the years, but on a limited basis. Farm products have been exported only during periods of high consumer demand rather than on a continual basis, as the harsh Upper Peninsula climate gives a competitive advantage to the farmlands of

the lower midwest. Also the remote location of the Upper Peninsula Region has placed it at a disadvantage in terms of accessibility for and to larger population centers and markets.

Existing Conditions

The approach to the utilization of the natural resources in this country has now changed. National and State forests are being managed under sustained yield practices. Multiple land use planning under professional guidance is becoming prevalent, especially where utilization of natural resources is involved. Land use controls on corporate land ownerships are advocated by legislators and the public. With new agricultural techniques and services, farmers today can produce better crops under adverse growing conditions than in the past. These developments, along with the relative stabilization of the mining industry in the Upper Peninsula have created a quiet, rural region of small communities.

From 1973 to 1976 there has been a definite increase in the demand for private second home and recreational lands in the Upper Peninsula. This development has caused a significant jump in land values and stimulated some rural residential growth.

Anticipated Future Conditions

Lands surrounding existing urban areas will experience future growth and extensive development. These lands are usually areas formerly devoted to agriculture; they offer the highest attraction as they presently have existing access, utilities and municipal services of school busing and snow removal. Some rural settlements and areas having an agricultural base logically separated from urban areas will probably decline in development.

The actual rate of growth and relative intensity of development within the Upper Peninsula Region is dependent upon many variables which cannot be anticipated with a high degree of accuracy. Changes in national domestic policy can have a far-reaching effect on the economy of the area, which in turn could affect out-migration rates. More important, expansion of the industrial and tourism sectors of the economy, largely dependent upon local initiative, would provide new jobs and tend to increase the economic base. The one industry which will definitely be expanding is the mining industry. This expansion is in response to a loss of foreign ore sources and improved mining and refining processes now being employed in the Study Area.

DISTINCTIVE UNITS AND CHARACTERISTICS

The pattern of land use and ownership in the Study Area has been significant in preserving relatively large portions of the natural environment. Spacious estates, corporation ownerships, and governmental lands have not been extensively subdivided or fragmented. Subdivision of large tracts of land into smaller tracts has been largely confined to urban areas.

The largest category of land use in the Study Area is forest land, capable of commercial production accounting for approximately five million ¹ acres or 85.9 percent of the total area. In the past, some species of sawtimber removed have exceeded allowable cut volumes, degrading forest quality and reducing subsequent growth potential. Public concern is expressed that commercial forest lands can be better managed to maintain a perpetual forest yield and to assure an environment receptive to a wide range of recreational activities. A large percentage of commercial forest land is in State and Federal ownership, with large tracts open to the public for hiking, fishing, hunting and camping.

The next largest land use in the Study Area is agriculture, which accounts for a little less than a half million acres or 7.7 percent of the land area. However, it was discovered by the Western Upper Peninsula Planning and Development Region (WUPPDR), through comparing 1963 aerial photographs with those taken in 1970 that approximately 16 percent of land classed as agricultural in 1963 had slipped into inactive use. Land held by retired farmers is sold to part-time farmers or those looking for recreational or retirement homes, further fragmenting agricultural land ownership.

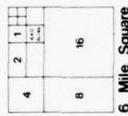
Following agricultural land use is public recreational land use. While land areas publicly owned and used primarily for recreation consume over 24,000 acres in the Study Area, commercial forest lands under the Commerical Forest Act and

¹ It should be pointed out that the above acreage, as well as other acreages cited in this narrative encompasses county land extending beyond the Study Area boundary. The relative percentage figures, however are just as valid for that area within the Study Area as they are for the complete eight-county region. Owing to the fact that the data were collected from a variety of sources and time series, a 1 percent to 5 percent error can be expected, the higher error being applied to the higher percentage figure.

Seafarer Site Survey Upper Michigan Region

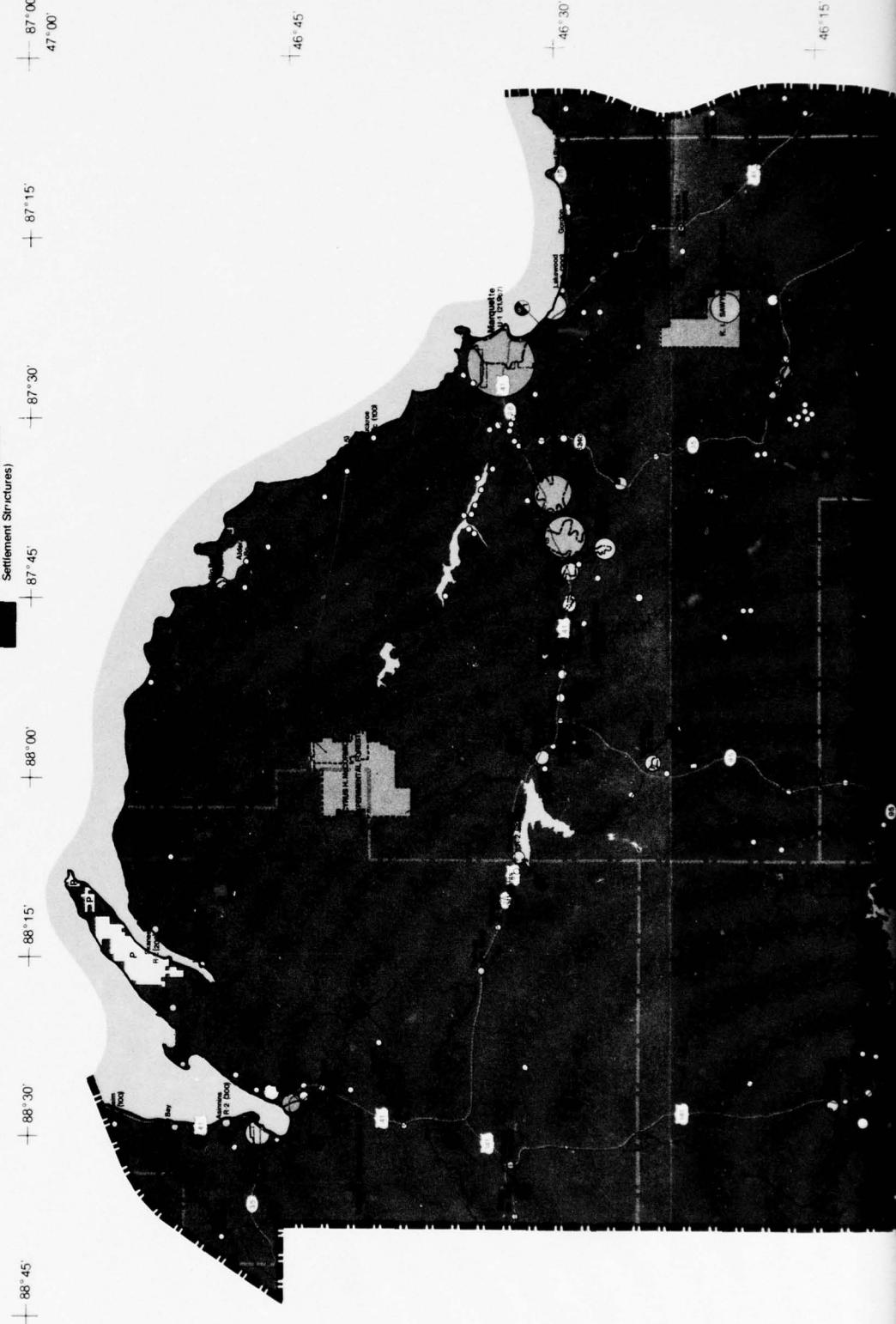
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Naval Electronic Systems Command
Naval Electronic Systems Command
Washington, D.C.



6 Mile Square

LAND USE





the State of Michigan forest lands are open to hunting, fishing, hiking, canoeing and camping, adding tens of thousands of additional acres to those seeking recreational pursuit. Additionally, privately owned and operated recreational activities such as game preserves, summer camps, hunting clubs and resorts supplement the use of publicly owned recreation lands throughout the Study Area.

The mining industry holds large acreages of land within the Study Area, but less than 2 percent is devoted to surface use¹.

Owing to areawide characteristics of fragmented property ownership and widely separated population centers land devoted to public highways, roads, railroads and airports is high in comparison to urban land area. Transportation accounts for 89,215 acres or 1.5 percent of total land area while urban land, inclusive of city and village streets, accounts for 58,340 acres or approximately 1 percent of the land area². Building clusters, forest hamlets and rural communities not classed as urban tend to occur primarily along main highways and access roads.

Land Use Definitions (Refer to Table 1)

Total area: the sum of "Inland Water" and "Land Surface".²

Inland water: includes the surface area of lakes, ponds and streams within the county. Excludes the Great Lakes.

Land surface: all land surface within the county excluding land areas underlying inland waters.

Forest: includes land which is at least 10 percent stocked by forest trees of any size. Excludes publicly-owned recreation land.

Agriculture: land utilized for the raising of livestock and crops, including pastureland, idle cropland and land in barn lots.

Transportation: land devoted to public highways, roads, railroads and airports. Does not include easements for pipelines and power transmission lines. Does not include city and village streets.

¹ Mr. Burton Boyum, Director of Administration, Cleveland Cliffs Iron Company, Ishpeming, Michigan.

² See footnote, previous page.

Public recreation: land publicly owned and used primarily for recreation. Includes productive public forest land withdrawn from commercial timber use, i.e., national forest campgrounds, state parks and state forest campgrounds. Includes game areas, fishing sites, public water access and county and township recreation areas.

Urban: all incorporated cities and villages over 2,500 inhabitants. Includes incorporated cities and villages between 1,000 and 2,500 inhabitants and unincorporated places over 1,000 inhabitants where population density is greater than 1,000 per square mile.

Other: includes land devoted to private recreation, unproductive forest land incapable of yielding industrial wood crops due to swamp and bog conditions and other land not previously categorized.

Settlements (Refer to Land Use Data Map)

U-1 Urban:

Incorporated cities and villages over 2,500 inhabitants.

U-2

Incorporated cities and villages between 1,000 and 2,500 inhabitants with a density greater than 1,000 inhabitants per square mile.

U-3

Unincorporated places over 1,000 inhabitants providing their density is greater than 1,000 inhabitants per square mile.

R-1 Rural:

Incorporated cities and villages over 1,000 inhabitants with a density less than 1,000 inhabitants per square mile and incorporated cities and villages of less than 1,000 inhabitants regardless of density.

R-2

Unincorporated settlements over 1,000 inhabitants with a density less than 1,000 inhabitants per square mile and unincorporated settlements between 200 and 1,000 inhabitants regardless of density.

Bc Building Cluster:

Three or more structures with no distance between any three buildings greater than 500 feet. This category includes building clusters of less than 200 inhabitants where some commercial facilities may exist. Unnamed settlements of small geographic extent were assumed to have fewer than 200 inhabitants and were so labeled as building clusters on the Land Use Data Map.

Planned Development (Refer to Land Use Data Map)

Planned development includes both legally recorded land development proposals and speculative land sales of major proportions. In Dickinson County there are two land parcels proposed for recreational development. In Baraga and Houghton Counties there are large speculative land sales. These tracts are subdivided but not legally recorded as a single tract development.

<u>Location</u>	<u>Description</u>
$47^{\circ}00'$ - $88^{\circ}15'$ and $88^{\circ}30'$	Land tract owned by Charles Boros subdivided for sale into 10-acre lots.
$46^{\circ}00'$ - $87^{\circ}30'$	Proposed recreation development owned by Norvul Inc. Consists of approximately 600 acres. Programmed features include: golf course, ski area and lodge, riding stable and bridle paths, snowmobile trails, tennis courts.
$46^{\circ}00'$ - $87^{\circ}45'$	Beaver Pete Campground owned by Mr. R. Theit. Consist of approximately 240 acres. Programmed features include: camping, swimming, and hiking.

Institutional

Cemeteries (Refer to Land Use Data Map)

Public and private burial ground as provided for in Article 7 Section 23 of the Michigan State Constitution are registered with the Department of Commerce Cemetery Commission. A copy of the laws relating to cemeteries is contained in Appendix A. In accordance with Act 182 Section 18 of the State of Michigan all easements for construction through a cemetery are prohibited unless appealed to the Cemetery Commission directors.

<u>Location</u>	<u>No.</u>	<u>Name</u>
$47^{\circ}00'$ - $88^{\circ}45'$	1	Keweenaw Bay
	2	Pelkie Finnish
$88^{\circ}30'$	1	Aura

<u>Location</u>	<u>No.</u>	<u>Name</u>
$46^{\circ}45' - 88^{\circ}15'$	2	Assinins
	3	Baraga
	4	Indian
$88^{\circ}45'$	1	Skanee
	2	Old Covington
	3	Covington
$88^{\circ}30'$	1	L'Anse
	2	Herman
$88^{\circ}15'$	1	Lakeview
$88^{\circ}00'$	1	Champion
$88^{\circ}45'$	1	Ishpeming
	2	Negaunee
$46^{\circ}30' - 88^{\circ}00'$	1	Humboldt
	2	Clarskburg
	3	Republic
$87^{\circ}45'$	1	Run Around or Bakkala
$87^{\circ}30'$	1	Green Garden
	2	West Branch
	3	Gwinn
$87^{\circ}15'$	1	Skandia or Haglund
	2	Emmanuel Church
$46^{\circ}15' - 88^{\circ}45'$	1	Iron River
	2	Rest Haven
$88^{\circ}30'$	1	Hematite Township
$88^{\circ}15'$	1	Channing
$88^{\circ}00'$	1	Ralph
$88^{\circ}30'$	1	Watson
$87^{\circ}15'$	1	Hillview
	2	Lathrop
	3	Rock
$46^{\circ}00' - 88^{\circ}15'$	1	Park
	2	Kingsford Quinnesec
$88^{\circ}00'$	1	Felch
	2	Norway
$87^{\circ}45'$	1	--
	2	Foster City
	3	Waucedah Township
$45^{\circ}45' - 88^{\circ}00'$	1	Riverside
$87^{\circ}45'$	1	Spalding
	2	Hermanville or Meyer
	3	Nadeau
	4	Carney
	5	Banat

Prisons (Refer to Land Use Data Map)

Establishment of state regional prisons is provided for in Act 232, Section 12 of the Public Acts of Michigan. In Marquette County there is a prison complex consisting of three sites: the main prison facility, a prison farm, and an honor camp. Rights-of-Way across prison lands are granted when it is to benefit the facility itself. Appeals are made to the Michigan Department of Corrections.

<u>Location</u>	<u>Description</u>
46°/45' - 87°/30'	Main prison facility
46°/30' - 87°/30'	Prison honor camp
46°/30' - 87°/30'	Prison farm

Water and Waste Water Service Areas (Refer to Land Use Data Map)

Recent studies on the part of the Western and Central Upper Peninsula Planning and Development Regions (WUPPDR and CUPPAD), indicate that distribution of population within the Upper Peninsula is more suited to the economics of multiple water and waste water systems than to large district or regional type distributions. Analysis shows, however, that geographically neighboring communities are providing water and sewage services on an individual governmental basis, while in other locations cooperative arrangements between neighboring agencies have developed over the years.

Within the communities in the Upper Peninsula Region now providing water and waste services, most of the facilities need major improvement to adequately serve their users. Public waste water systems range from a simple discharge of raw sewage to a swamp or stream without septic tank treatment, to both primary and secondary treatment facilities. Public water supplies are more prevalent for communities providing waste water collection service. Water supply service usually extends beyond the geographic limits of waste water service areas. Additionally, some communities provide only public water supply. Like the sewer systems water supply systems range from very good to very poor in quantity and quality of water produced.

Many water and sewer systems in the Upper Peninsula are not publicly owned, yet serve the general public and are therefore classified public under State law and subject to State regulations. Based on new goals for service improvements,

the regional planning commissions have recommended that numerous changes be made to existing service systems. Improvements are primarily concerned with publicly owned water and waste water systems which, for example, are owned by a township, village, city, or those owned by a county acting through a department of public works and operated under a contract between the DPW and the township, village or city. State law provides that improvements may be constructed, operated or financed by local township, or county government. However, in that county government is established to provide countywide services, its capabilities could be expanded to administer certain phases of regional water supply and waste water treatment in a manner not now in existence.

In summary, it is recognized within the Upper Peninsula Region that the provision of central water and sewage facilities is necessary to sustain urban land developments in a safe and sanitary condition. Where higher density development occurs within these facilities, domestic water supplies are subject to pollution, as evidenced by scattered reported incidents of detergents occurring in drinking water.

Systems improvement is needed in the future to reduce potential health hazards which this condition implies, updating existing systems to meet current and future demands and recognizing the higher governmental standards relating to pollution and protection of the environment.

Celotex Corporation Sewage Disposal Site (Refer to Land Use Data Map)

In Baraga County, L'Anse Township, the Celotex Corporation has a large waste disposal site on land outside of the L'Anse village corporate limits. The system consists of several large sewage ponds, and a leaching canal of approximately two miles connected to a leaching field of about 3/4 of a square mile.

Upper Peninsula Experimental Forest (Refer to Cultural And Recreational Data Map)

The Upper Peninsula Experimental Forest was established in 1926 and consists of over 5,000 acres located at Dukes, Marquette County, approximately 20 miles southeast of the City of Marquette. The tract was given National Forest status in 1935 and is maintained by the Forest Service,

U. S. Department of Agriculture. Appendix D contains a detailed description of the Experimental Forest and its management objectives. Location of the tract within the Study Area is shown on the Cultural And Recreational Data Map and a more detailed map of the forest is contained in Figure 1.

With the exception of 320 acres of the original forest, which is handled under cooperative agreement with the Cleveland Cliffs Iron Company, the timber on the Experimental Forest is cut and sold under national forest timber sales procedure in cooperation with the Upper Michigan National Forest.

The Experimental Forest is well provided with main hauling roads, either through existing State highways, county roads, or roads constructed by the Forest Service. In addition, a system of low standard logging roads makes the area very accessible for utilizing the timber crop.

The main management objectives of the Upper Peninsula Experimental Forest include:

Investigation of forest problems - The objective is to develop and demonstrate better methods of handling forest lands and forest crops in the northern hardwood region.

Demonstration of the possibilities of sustained yield - Northern hardwoods grow slowly. It may take 80 to 100 years to grow even a small sawlog. Still it is possible to have an annual return from a forest provided that a variety of sizes and ages of trees are represented in the growing stock or forest capital.

Maintenance of a permanent local forest community - In connection with the management of the forest, every effort is being made to provide regular part-time employment for as many of the local farmers as possible. Timber sales are for the most part small and well distributed among the permanent residents of the community.

Forestry, in its broadest aspect including all phases of forest production and forest use, is bound to occupy a leading place in the future development of the Upper Peninsula Region and the northern Lake States in general. Forest lands in Michigan are being developed either as timber-producing units or as hunting reserves, parks, and recreational areas by all classes of owners, including the



U.S. Department of Agriculture
Forest Service
John R. McGuire, Chief

Hiawatha National Forest (West Unit)

T. 46 N., R. 23 W.

MICHIGAN

1975

Scale 1:31,680

1 mi.

LEGEND

- National Forest Boundary
- Interstate Highway
- U.S. Highway
- State Highway
- County Route
- Forest Route
- Monumented Corner
- Meander Corner
- Trail or Mammay
- District Ranger Station
- National Forest Land as of November 1, 1974
- Forest Supervisor's Headquarters, Escanaba, Michigan

Current Study Areas (March 3, 1976)

Figure 1

14

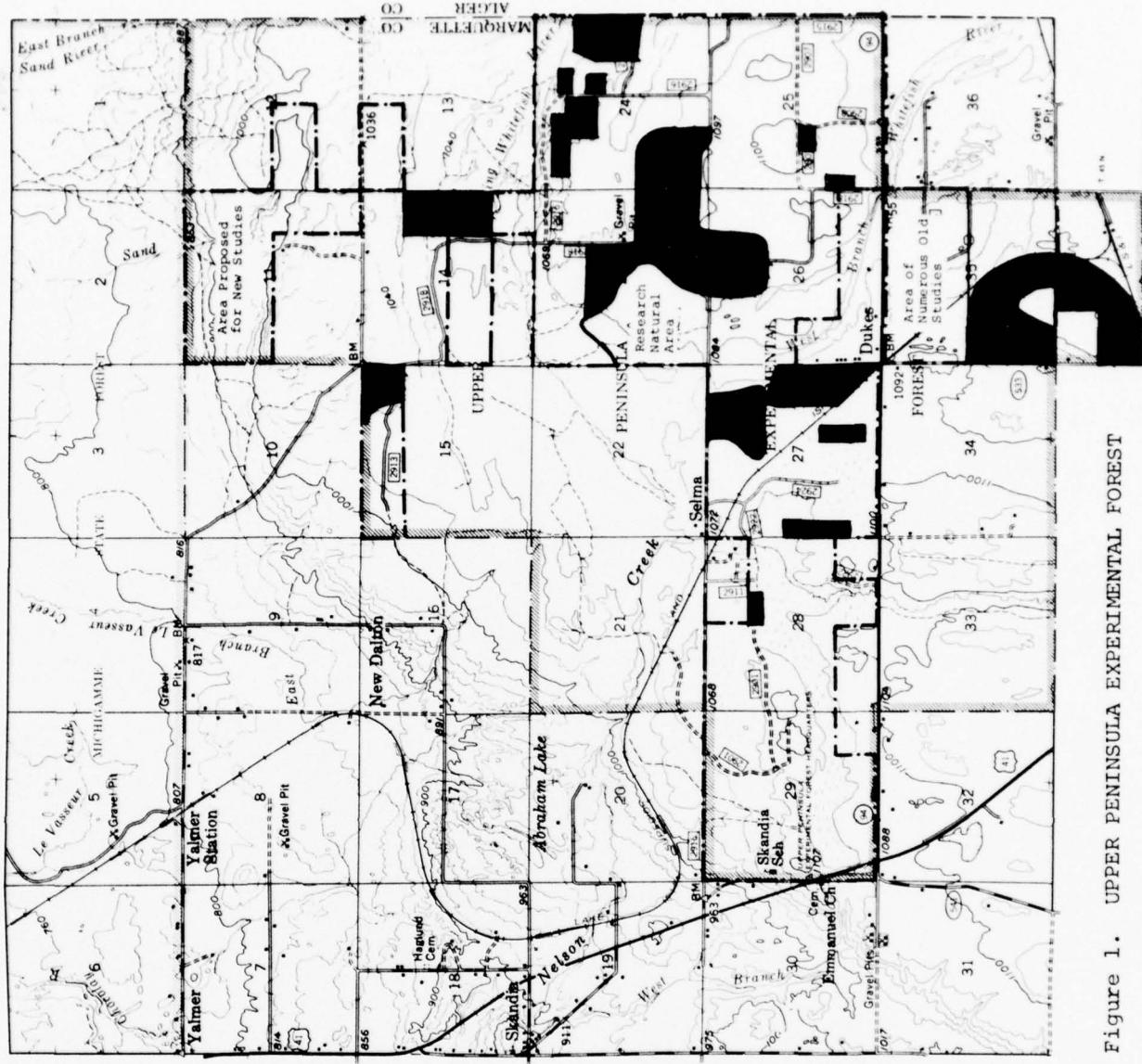


Figure 1. UPPER PENINSULA EXPERIMENTAL FOREST

FOREST SERVICE MAP CLASS A
Prepared by: Perfection - 1927 North, American Datum
Monumented and meander corners used in preparing accurate position only
Contour datum is mean sea level and is indicated to 20 foot intervals
Maps have been photomechanically reproduced and converted to 31,680 scale
Measurements made from 1:42,500 scale U.S. Geological Survey Standard Accuracy
contouring maps. Rescaled from 1:60,000 scale from attitude 1970 aerial photograph
Primary with 1970 field observations by
G. Johnson, L. L. Linn
U.S. Forest Service, Eastern Region
Mackinaw City, Michigan
Map No. 1975-1927-544
Scale 1:31,680
March 1976

federal, state, county, and city governments, schools, lumber and paper companies, and various others. The Forest Experiment Station's objective is to furnish a basis of sound scientific facts for the development of the forest lands for these different purposes.

Special Land Use Areas (Refer to Land Use Data Map)

East Branch, Sturgeon River Watershed

The Sturgeon River Watershed is an 83,980-acre land tract located in the central portion of Dickinson County. A watershed work plan has been jointly prepared by the Dickinson Soil Conservation District, the Dickinson County Road Commission and the East Branch of the Sturgeon River Water Users Association. Excerpts of the plan are contained in Appendix B.

The plan calls for three reservoir structures to be built for the purposes of:

- o flood prevention of agricultural lands and transportation facilities;
- o irrigation of local potato and oat crops;
- o provisions for general recreation.

The project is funded by the Michigan Department of Conservation, the U. S. Department of Agriculture, and the Economic Development Administration of the U. S. Department of Commerce.

Operation and maintenance of all dam structures will be the responsibility of the Dickinson County Road Commission. Recreational functions will be the responsibility of the Michigan Department of Conservation.

Structure No. 1

Location: $88^{\circ}00'00''$ - $46^{\circ}15'00''$

Use: flood control and recreation

Recreation pool: 700 surface acres

Overall storage capacity: 6,088 acre feet

Top of dam elevation: 1,160'

Normal pool elevation: 1,154'

Depth of publicly owned shoreline: 1/4 mile

Completed and nearly full as of December 16, 1975

Structure No. 2

Location: $87^{\circ}45'00''$ - $46^{\circ}00'00''$
Use: flood control, recreation, irrigation
Recreation pool: 1,060 surface acres
Overall storage capacity: 10,770 acre feet
Top of dam elevation: 1,066'
Normal pool elevation: 1,060'
Depth of publicly owned shoreline: 100'
Complete but had not been filled as of December 16, 1975

Structure No. 3

Location; $87^{\circ}45'00''$ - $46^{\circ}00'00''$
Use: irrigation, recreation
Recreation pool: 29 surface acres
Overall storage capacity: 74 acre feet
Top of dam elevation: 1,031'
Normal pool elevation: 1,022'
Depth of publicly owned shoreline: 100'
Planned for completion in summer of 1976

Cyrus H. McCormick Experimental Forest

In 1901, Cyrus McCormick, son of the inventor of the McCormick reaper, and attorney Cyrus Bentley of Chicago began buying land in western Marquette County and eastern Baraga County. Eventually they controlled over 17,000 acres of land (much of which had been previously logged over), containing 16 lakes, numerous streams and a variety of game animals. McCormick's son Gordon died in 1967 and left the property to the care of the U. S. Forest Service.

To keep the land in a wilderness condition, Ottawa National Forest officials in early 1970 announced a set of rigid regulations for the McCormick tract. Overnight camping was banned and all horses, motorcycles, cars, snowmobiles, carts and motorboats were prohibited. Officially designated the Cyrus H. McCormick Experimental Forest, the value of the Forest for increasing research interests depends to a large degree on its isolation and relative lack of use. There is good road access to only one corner of the 17,000-acre tract and there is only casual day use by fishermen and hunters.

A large area in the northeast corner has received virtually no logging or roading. Because of its unique land features and northern hardwood forest qualities, 3,675 acres of the northeastern section was designated a Research Natural Area

of the National Forest System in 1971. A copy of the McCormick Research Natural Area Establishment report is contained in Appendix C. Forest Service research was begun in the area in 1970 and plant communities of varying description were inventoried. (By comparing on-going measurements with similar ones made in experimentally logged areas, it is possible to determine how northern hardwood forests respond to such use.)

In the effort to evaluate what protection is needed from possible increases in human usage, researchers from Northern Michigan University have gathered baseline information for the U. S. Forest Service on birds and mammals present in the McCormick Forest. This research has resulted in the publishing of a U.S.D.A. Forest Service Research Paper entitled "Vertebrate Animal Population of the McCormick Forest".

The McCormick Experimental Forest is regarded by the Forest Service, educators, and researchers of the region as containing enough of the elements of the primitive world to justify efforts to describe them. Within the setting of the Research Natural Area of the northeast section of the Forest, ecologically-based scientists hope to find their best opportunity to prepare more definitive descriptions of large-scale ecologic processes.

K. I. Sawyer Air Force Base

The site of the K. I. Sawyer Air Force Base was acquired by the County of Marquette in 1940 for the purpose of constructing a new county airport. Construction of the airport did not begin until 1945 and was completed in 1949. The total capital investment in the project was approximately \$150,000. The airport consisted of two paved runways; one dirt strip, for emergency use; concrete parking aprons, for commercial airlines; temporary office and depot buildings; and two small hangar for single engine aircraft.

On January 1, 1955, a 99 year lease was signed by the United States Government and Marquette County. Through this lease the U. S. Government acquired K. I. Sawyer County Airport as the site for the construction of K. I. Sawyer Air Force Base.

The Base was initially commanded by the 56th Fighter Wing. Tenant units consisted of the 62nd Fighter Interceptor Squadron, the Sault Ste. Marie Air Defence Sector and the

4042nd Strategic Bombardment Wing. The 4042 Strategic Bombardment Wing was redesignated the 410th Bombardment Wing in 1963 and in 1964 assumed command jurisdiction of the Base.

Today the Strategic Air Command through its assigned organizations, the 410th Bombardment Wing, and the 410th Combat Support Group commands K. I. Sawyer Air Force Base. Reporting relationships are depicted in Figure 2.

Tenant commands and their assigned organizations include: The Aerospace Defense Command, operating the 87th Fighter Interceptor Squadron; The Military Airlift Command, operating Detachment 2 of the 39th Aerospace Rescue and Recovery Wing, and Detachment 24 of the 26th Weather Squadron; the Air Training Command, operating the 225th Field Training Detachment; The Air Force Office of Special Investigation, operating Detachment 512 of the Air Force Communication Service, operating the 2002st Communication Squadron; The Department of Defense, operating the Defense Supply Agency and the Defense Investigative Service; and finally the U. S. Air Force Hospital and the Air Force Audit Agency.

The following are current mission statements for the assigned organizations stationed at K. I. Sawyer Air Force Base.

- o 410th Bombardment Wing (Heavy) (SAC) - acts as a deterrent in times of peace, and in the event of war, acts as a nuclear strike force destroying enemy targets.
- o 410th Combat Support Group (SAC) - provides for the operation and maintenance of K. I. Sawyer Air Force Base in direct support of the 410th Bombardment Wing, its assigned units, and tenant organizations located on the installation.
- o 87th Fighter Interceptor Squadron (ADC) - provides an alert scramble capability for the identification of friendly aircraft and the destruction of hostile forces.
- o Detachment 2, 48th Aerospace Rescue and Recovery Squadron (MAC) - provides rescue coverage for the 410th Bombardment Wing and the 87th Fighter Interceptor Squadron's flying operations. Also responds to search and rescue operations under the National Search and Rescue Plan, and provides emergency medical evacuation to the military and civilian communities.

Figure 2. REPORTING RELATIONSHIPS AT
K. I. SAWYER AIR FORCE BASE

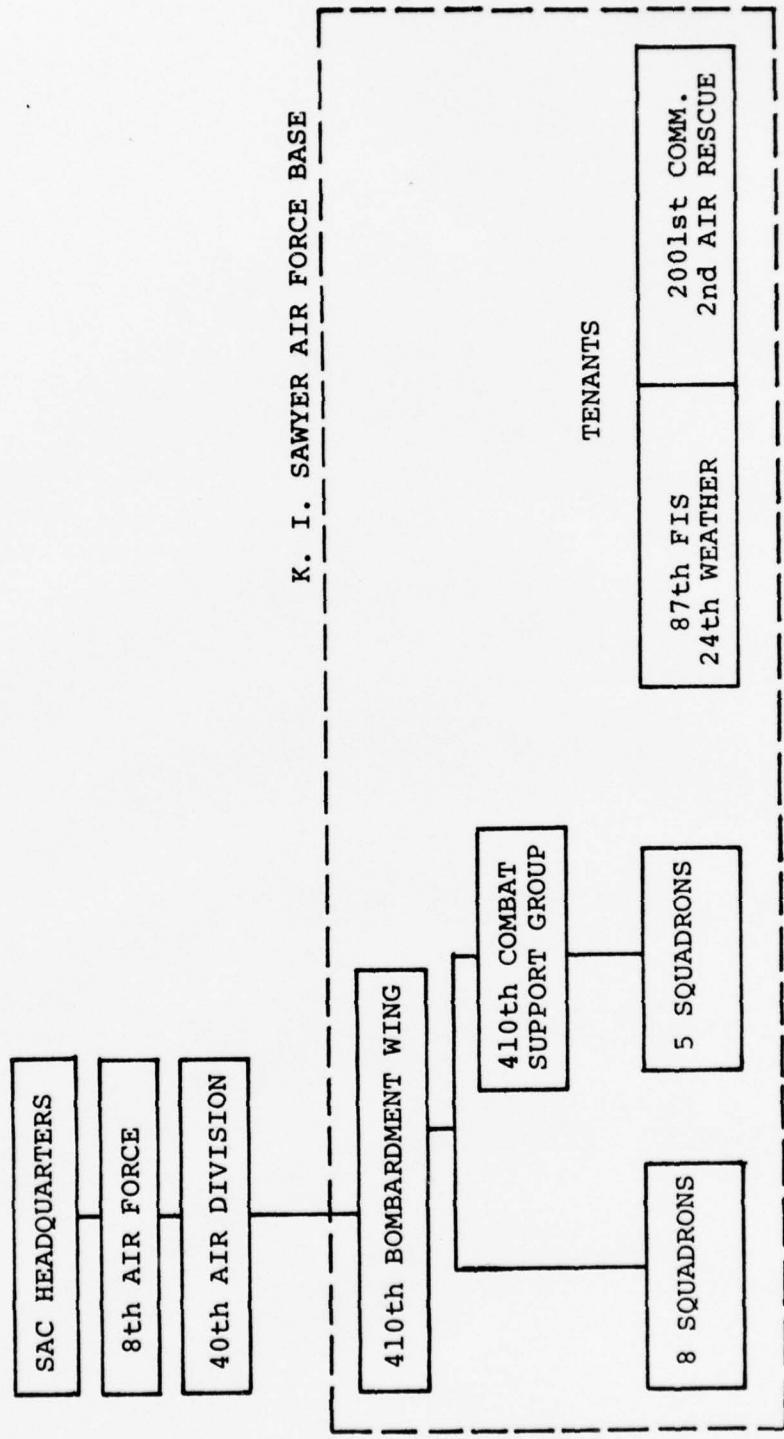


Figure 2

- o U.S.A.F. Hospital - provides medical services to patients from the military community and other authorized medical care at government expense.
- o Detachment 24, 26th Weather Squadron (MAC) - gathers and analyzes meteorological and environmental data for dissemination to flight crews, base assigned units, and tenant organizations.
- o Detachment 20, 3904th Management Engineering Squadron (SACMET) - assists commanders in the determination, allocation and effective utilization of manpower through analysis of conditions and by accomplishment of management advisory studies.
- o 225th Field Training Detachment (ATC) - provides technical instruction on the B52H, KC135, and F106 aircraft and associated support equipment to assist unit commanders in satisfying their training requirements.
- o Detachment 512, Air Force Office of Special Investigation (AFOSI) - provides counterintelligence, criminal, and special investigative services for all Air Force activities; to collect, analyze and disseminate counterintelligence data; and to collect and report information which is pertinent to base security.
- o Air Force Audit Agency (AFAUD) - provides all levels of Air Force management with an independent, objective and constructive evaluation of the effectiveness and efficiency with which managerial responsibilities are being carried out in financial, operational and support activities.
- o 2001st Communications Squadron (AFCS) - operates navigational aids and provides air traffic control services as required to support the mission of units located at K. I. Sawyer Air Force Base.
- o Defense Supply Agency, Defense Property Disposal Office (DOD) - achieves maximum reutilization of DOD-owned material and equipment. Receives, classifies, segregates and reports excess material for screening and for the lotting, merchandising and preparing for sale, and in some cases, selling surplus property.
- o Defense Investigative Agency (DOD) - conducts all background security investigations for security clearances for all DOD activities.

K. I. Sawyer Air Force Base covers approximately 5,200 acres of land area; 2,635 acres have been obtained in fee, 361.58 acres consist of easements, 2,002.58 acres are under lease agreements and 160 acres are public domain lands (see Figure 3). The Air Force Base is divided into 8 use areas; airfields, cantonment and operations, family housing munitions storage and handling, recreation, sanitary fill, schools and clearance easements (see Figure 4).

Thirty-seven percent, approximately 1,938 acres of the Base area is devoted to airfields. The existing runway system consists of a 300 foot wide runway, 12,300 feet long; and a 75 foot wide taxiway, with 50 foot bituminous shoulder on each side. There are four connecting taxiways between the runway and the parallel taxiway. A 1,000 foot long by 300 foot wide overrun strip has been provided at both ends of the runway.

The cantonment and operations area is approximately 741 acres and includes aircraft shops, hangars, supply warehouses, fuel storage and dispensing facilities, squadron operations facilities and quarters for bachelor officers and airmen (see Figure 5). This area also includes administrative facilities for assigned and attached units plus normal base support activities, including a medical facility and weapons firing range.

The family housing area covers approximately 591 acres and consists of 1,693 family units, within 660 buildings, and 199 trailer pads. Family units provide housing for most eligible personnel with trailer pads providing additional rental spaces and utilities for privately owned mobile homes.

Approximately 703 acres are being used for munitions storage and handling. Included in this area are the ordnance storage facility, the explosive cargo loading/unloading area, an explosive ordnance disposal facility plus lands required for safety clearance zones around each of these facilities. The ordnance storage facility currently requires a safety clear zone of 1,250 feet, the explosive ordnance disposal facility has a 1,200 foot clear area, but requires one of 2,400 feet.

Seven hundred thirty-eight (738) acres are devoted to recreational usage. A nine hole golf course is in operation, with an area cleared for nine more holes. The ski hill can accommodate about 300 people on an average day. Snowmobiling is a rapidly growing sport in the area, with an estimated 350 to 400 snowmobiles on base. There are plans to connect the on-base snowmobile course with the off-base county course. The base lake is used for fishing, swimming and picnicking.

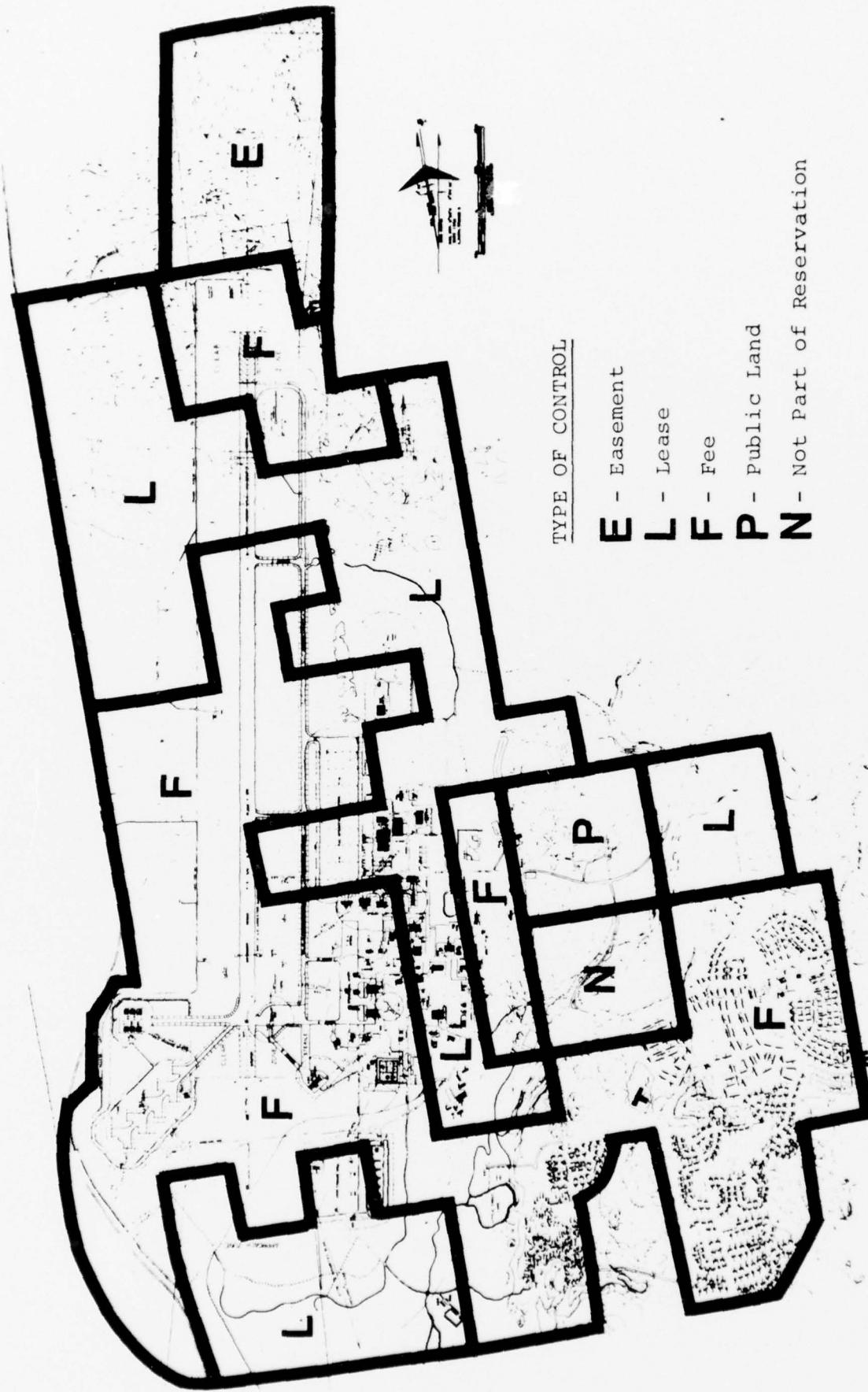


Figure 3. K.I. Sawyer A.F.B. - Simplified Ownership Map

Source: K.I. Sawyer Master Plan

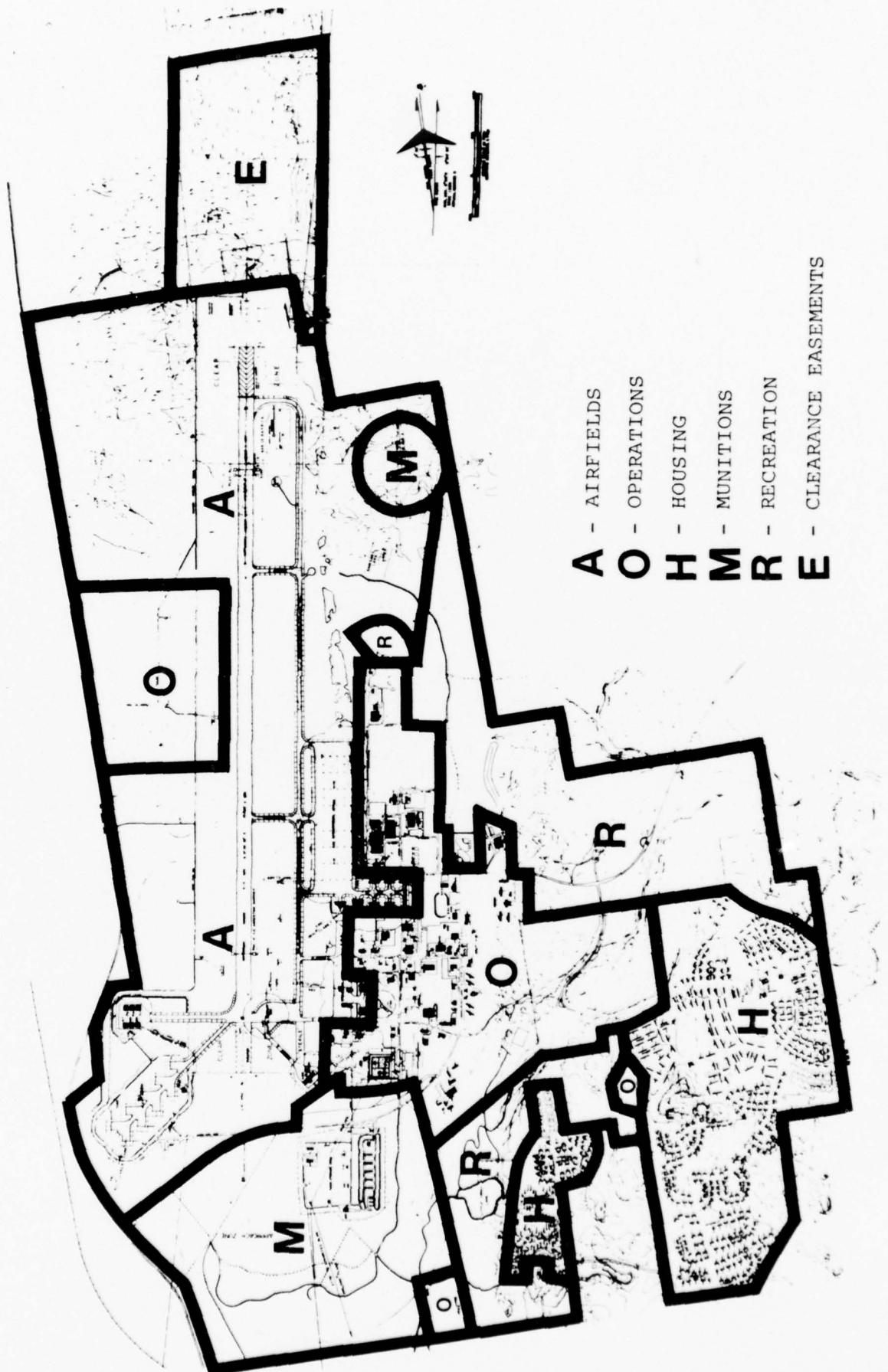
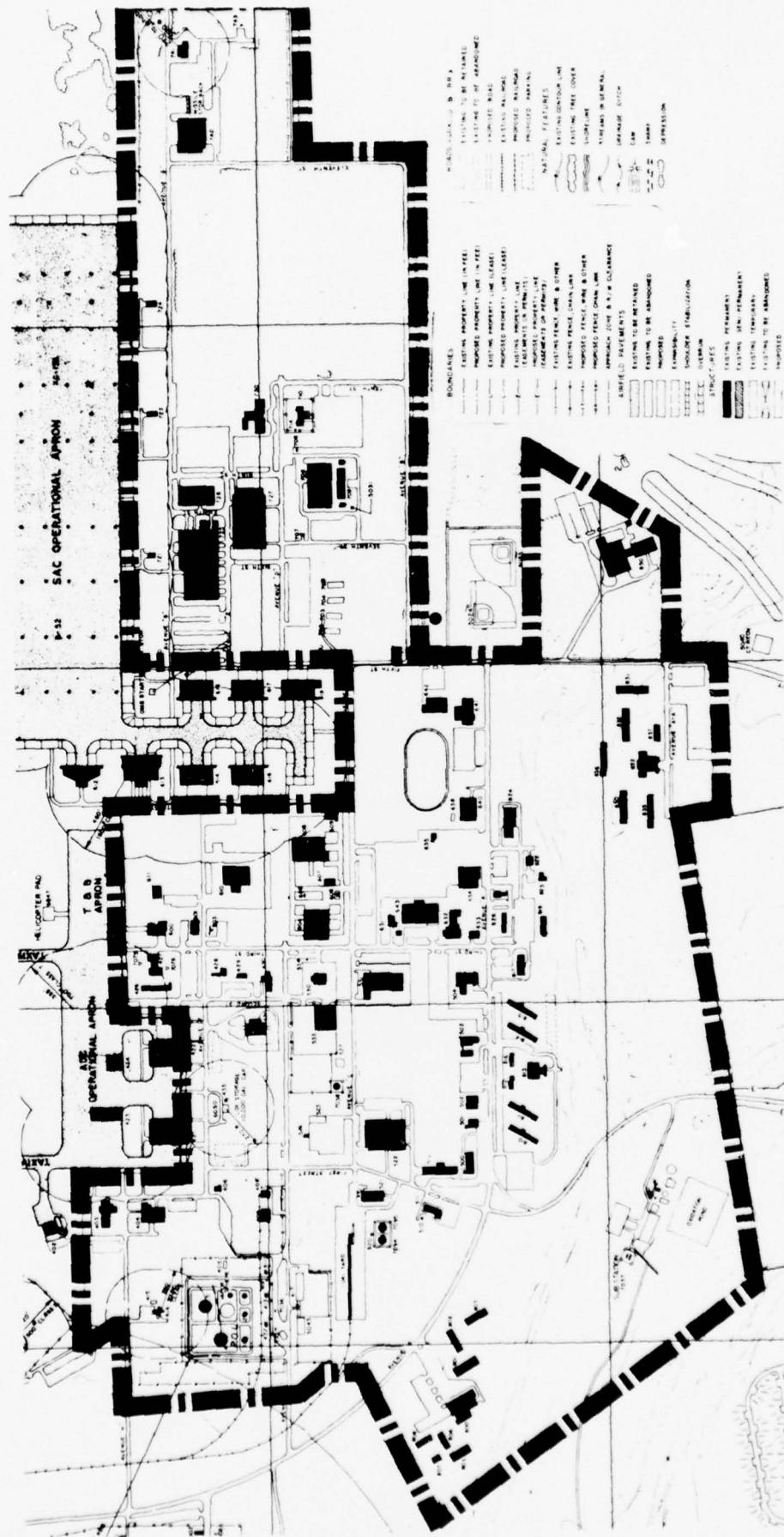


Figure 4. K.I. Sawyer A.F.B. Use Areas

Source: K.I. Sawyer Master Plan



Source: K.I. Sawyer Master Plan

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permit fully legal reproduction.

Approximately 116 acres are set aside for sanitary fill, and allow for the disposal of approximately 67,000 cubic yards of sanitary refuse annually. It is estimated that approximately six acres per annum will be required for sanitary fill purposes. There are currently no provisions for off-base refuse disposal.

Nine acres have been outgranted to Forsyth School District Number 7 for the operation of an elementary school to support dependent children residing on base.

Within all eight use areas there are a total of 890 buildings, 41 miles of paved roads and two miles of railroad. The Base provides 883,026 square feet of administrative and industrial space, 1,693 family housing units and quarters for 1,421 single airmen and officers. Total base population is approximately 10,000; 4,200 military personnel, 450 civilian employees and 5,350 dependent.

Special Use Preserve Areas

In November of 1973 the Western Upper Peninsula Planning and Development Region completed an environmental land use plan for the six counties under its jurisdiction. This plan is intended to be used as a tool in decision making by governmental officials from the township level up. Implementation of this plan will be largely the responsibility of the local county planning and zoning commissions.

One aspect of this plan of particular importance is the Special Use Preserve Areas (see Figure 6). These areas are intended for combination of the following uses: wildlife management, open space, wilderness-like areas and passive recreation areas. Secondary uses would be allowed only after approval by the managing entity. No such lands have been identified for the counties under the jurisdiction of the Central Upper Peninsula Planning and Development Region as yet.

There are a total of 12 special use preserves within the Western Upper Peninsula Planning and Development Region portion of the Study Area, the McCormick tract, Craig Lake State Park, Sturgeon Gorge Area, Keweenaw Bay Swamp, Pequaming Swamp, Huron Bay Swamp, North Lightfoot Bay Shoreline, Point Abbaye Peninsula, Baraga Green Belt, Ojibway Red Pine Stand, Sturgeon Sloughs and Iron River Urban Open Space Systems.

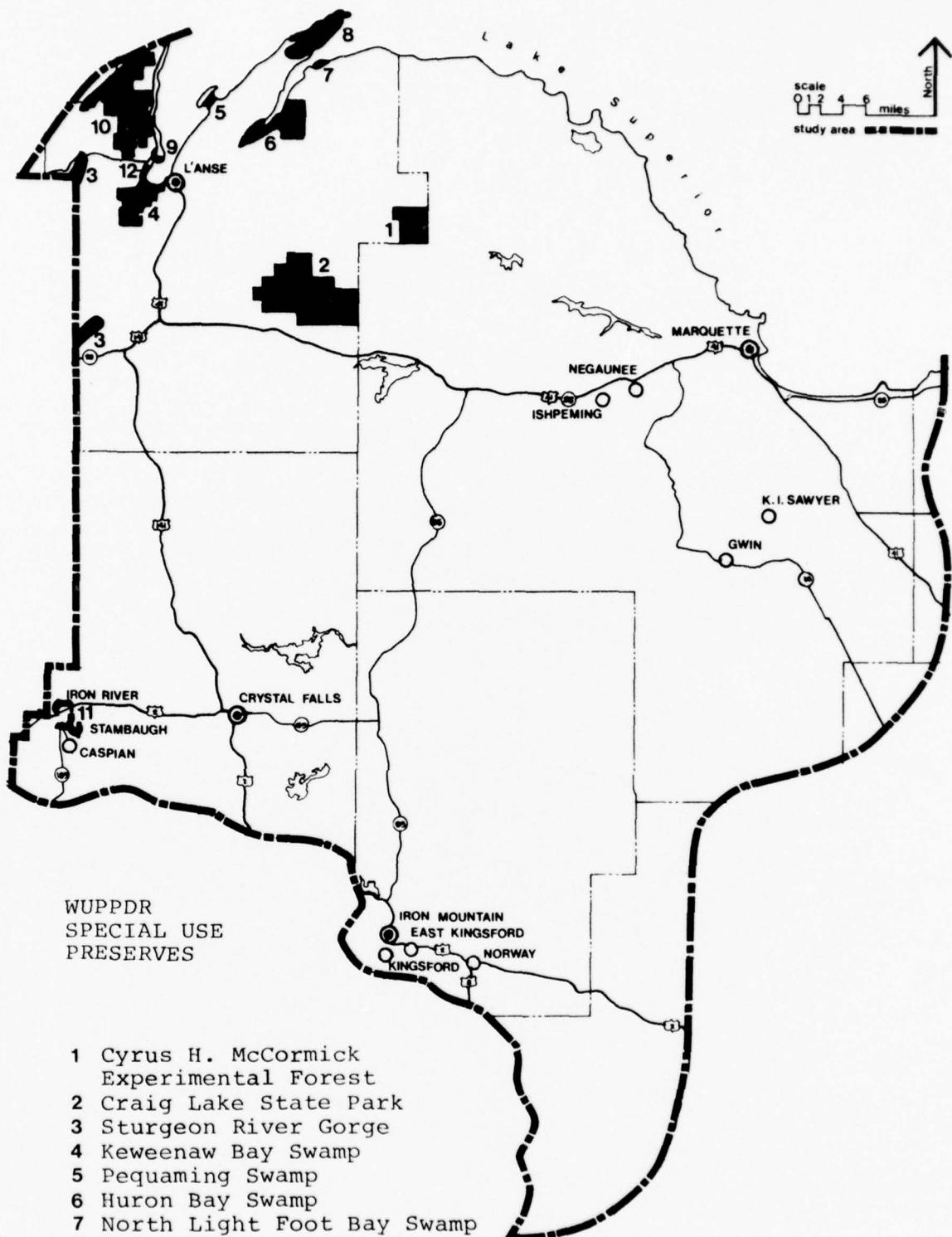


FIGURE 6

The following are descriptions of these special use preserves as presented in the WUPPDR Environmental Land Use Plan.

"In Baraga County, there are two existing public wilderness-like areas: the McCormick Tract (USFS) and Craig Lake State Park (DNR). Both these areas are characterized by steep slopes and shallow bedrock. It should be pointed out that the DNR allows timber harvesting within certain areas of Craig Lake under the multiple use concept. The only recommendation which the plan makes at this point is to change the configuration of the Park in order to take in more eagle nesting habitats to the west of the existing park boundary. The geographic area where these two areas are located is called the Arvon Mountains. From a long range standpoint, this area offers opportunities for the creation of other public wilderness-like areas due to its lack of metallic mineral potential and its marginal value for commercial forestry.

"Along the western boundary of Baraga County is the Sturgeon Gorge Area, characterized by steep slopes, rough broken land and spectacular scenery. It is proposed that this area be dedicated as a wild area within the Ottawa National Forest.

"At the base of Keweenaw Bay is a large swamp and its watershed. The area is renowned for its trout fishing as well as scenic value (see page 68 WUPRPC Open Space Plan). This area, through the exchange of land, should be established as a State Forest. The same recommendation applies to the swampy area at Pequaming, the areas at the base of Huron Bay and the shoreline North of Lightfoot Bay.

"At the tip of the Point Abbaye Peninsula are approximately 4,000 acres of land unsuitable for development or commercial forestry. This area is characterized by bedrock outcroppings along the lakeshore, the presence of a deeryard and an inactive eagle nest. It is recommended that this area be established as a state wild area or forest and that state ownership be 'blocked in' within this area by acquisition or preferably by exchange.

"The Sturgeon Sloughs area in North Baraga County and the Chassell Township portion of Houghton County, besides being unsuitable for development due to the areas characterized by poor drainage and flooding, is an excellent waterfowl management area. It is recommended that the primary use for this area be wildlife management with timber cutting as a secondary use.

"Remaining areas in Baraga County falling within this land use category are an urban greenbelt in the Village of Baraga and the Ojibway Red Pine Stand. Recommendations for these two areas are found on pages 69 and 85 of the WUPRPC Open Space Plan.

"In Iron County there are only two areas which fall under the special use preserve category. These areas are urban open space systems identified on page 85 of the WUPRPC Open Space Plan."

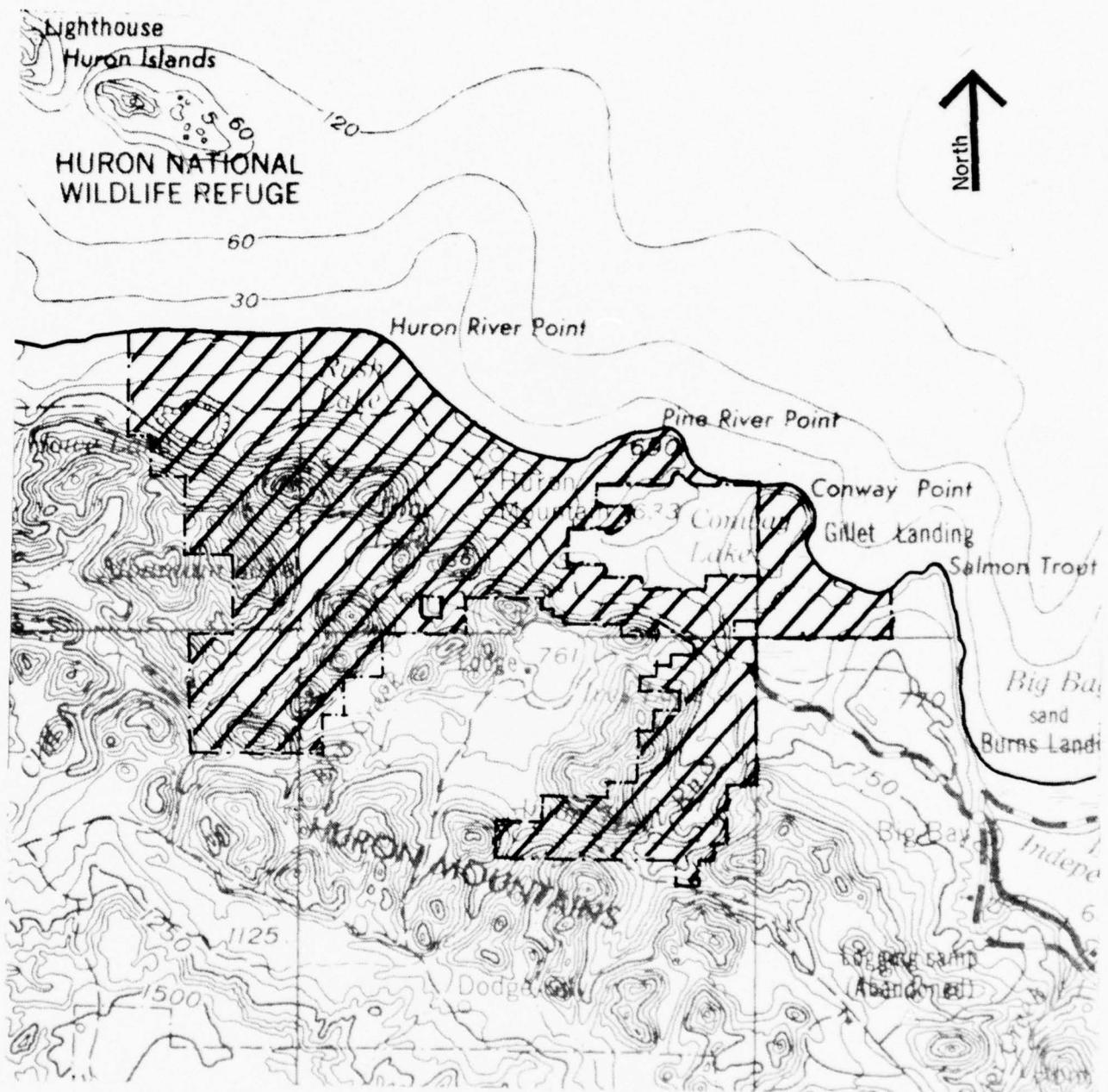
Potential Huron Mountain Wilderness Area (Refer to Wildlife Data Map)

The Huron Mountains are located along a 22-mile stretch of Lake Superior's southshore in the north central portion of the Study Area and occupy nearly 100,000 acres.

The Huron Mountains sweep up from a low, level lake plain that borders on the lake. The coastal line along this plain varies from precipitous cliffs to sand beaches with intervening low, broken sandstones completing the lakeshore physiography. Several small lakes rest upon this level plain, collecting the waters that cascade down the escarpment formed by the flanks of the Huron Mountains' northern edge. These mountains are among the highest in Michigan, rising over 1,000 feet above the surrounding region. Nestled among these ancient granite domes are several picturesque lakes, keynoting the northern Great Lakes scene. All of the Huron Mountain drainage system flows eventually into Lake Superior, carried there primarily by the Salmon Trout, Huron and Pine Rivers. Falls and cascades mark the mountain water courses, whereas meandering streams characterize the gentle terrain of the surrounding plains.

Remnants of old mature forests exist over portions of the mountain region, although elsewhere logging has altered the forest communities. South of the Hurons, the Yellow Dog River cuts through portions of a vast glacial moraine and outwash plain where large open stands of jack pine spread out in an almost limitless expanse. Deer and bear frequent these northern forests, while evidence of a lynx and, rarely, a wolf may be detected.

A major portion of the outstanding elements of the Huron Mountains is owned by an Huron Mountain club. A map of the club owned land is shown in Figure 7. Now used as a vacation site, the natural character of the landscape has been



HURON MOUNTAIN CLUB

Source: Department of Natural Resources

Scale 1" = 2 miles

Figure 7

adequately preserved. This area is considered by the Department of Natural Resources to have high wilderness potential. In the event that the land becomes available, every attempt would be made by the State to purchase the land and then designate it as a wilderness area. Elsewhere, logging has been a principal use on private and corporation lands. This is particularly true on the west side of the Hurons, though some isolated tracts of virgin forests are reported to remain. State properties are limited to a few scattered tracts administered as part of the Michigamme State Forest.

Estimated Population (Refer to Land Use Data Map)

Since the homesteading days in the 1800s, Michigan counties have been subdivided into a number of smaller units called political townships. The township boundaries are geometric, and generally follow the sightlines of the surveying grid. Total population figures are available for the townships and provide a ready means for determining to a finer degree the population included within the Study Area. Data on the population and demographic characteristics of cities and counties within the Study Area are contained in the Socioeconomic narrative.

As census-defined population figures for all of the named towns and places in the Study Area were not available, a methodology was devised whereby reasonable estimations of the size of the population in all clusters could be made. All the political townships partially or wholly contained within the Study Area and the 1970 population figures for each town are included in Table 2. Given the large scale of the Study Area, estimates of population using mapped dwelling units could not be made. Thus, we chose a method of proportional allocations, assuming that the relative physical sizes of the named towns and places were indicative of their relative population size. Population allocations for each of the political townships included within the Study Area thus progress through several levels of accuracy.

At the first order of accuracy, actual 1970 census head counts can be given for the large cities in the county, for total political township population, and for larger towns included within those townships.

Second-level accuracy is approached for townships in which over 60 percent of the population can be located through census figures. The remaining 40 percent or less is then divided evenly among the smaller towns for which census data are not available.

Third-order accuracy, admittedly a very rough estimation, is approached for townships in which less than 60 percent of the population can be located through census figures. In these cases, the relative sizes of the communities were estimated, and population was allocated to them according to size. Those towns just large enough to appear on road maps of the scale of 1" = 20 miles were assumed to have a population of 200, a number which is average from the census figures available for similarly sized communities in the region. Those towns and named population clusters too small to appear on 1" = 20 mile scales maps were estimated to have a population of 100.

For all of the smaller rural towns, population is most likely spread from a core area outward along the main roadways. Thus, the estimated population counts cannot be regarded as pinpointing of residents, but rather as a suggestion of the number of people inhabiting the general area around the named place.

Table 2. POLITICAL TOWNSHIPS AND POPULATION
OF TOWNS INCLUDED IN THE STUDY AREA

<u>County</u>	<u>Political Township</u>	<u>Towns</u>	<u>1970 Town Population</u>
Alger	Limestone	Kiva	50
		Ladoga	20
	Onota	--	--
Baraga	Arvon	(Sundell)	100
		(Huron Bay) *Skanee	100 200
Baraga	Baraga	(Arnheim)	100
		Asinnins	300
		Baraga	1,116
		*Keweenaw Bay (Pelkie)	200 100
	Covington	*Covington *Nestoria (Watton)	200 200 100
Baraga	L'Anse	(Alberta Location)	100
		*Aura	200
		(Herman)	100
		L'Anse	2,538
		Pequaming	300
Spurr		(Imperial Heights)	100
		Three Lakes	50
Delta	Maple Ridge	(Lathrop)	100
		Rock	475
Dickinson	Breen	(Foster City)	100
		(Hardwood)	100
	Breitung	East Kingsford (Quinnesec) (Merriman)	1,155 100 15
Felch	Felch	(Felch)	100
		Felch Mountain	50
		Theodore	150

* Indicated town appearing on maps scaled at 1" = 20 miles, for which population had to be estimated (see text).

() Indicates town appearing only on maps scaled at less than 1" = 20 miles, for which population had to be estimated (see text).

A number of very small towns did not appear on regional maps at all. These are noted on the Land Use Data Map, but not in Table 2.

Table 2. (continued) POLITICAL TOWNSHIPS AND POPULATION OF TOWNS INCLUDED IN THE STUDY AREA

<u>County</u>	<u>Political Township</u>	<u>Towns</u>	<u>1970 Town Population</u>
Dickinson (continued)	Norway	Vulcan	600
		West Vulcan	300
	Sagola	Channing	550
		(Floodwood)	15.0
		(Granite Bluff)	15.0
		*Randville	200
		Sagola	108
	Waucedah	*Loretto	200
		*Waucedah	200
Iron	West Branch	(Alfred)	28.5
		(Ralph)	28.5
	Bates	(Bates)	100
		(Mapleton)	100
		Rogers	200
	Crystal Falls	(Balsam)	100
		(Gibson Lake)	100
		(Monongahela Location)	100
		(New Bristol Location)	100
		(Odgers Location)	100
		(Shaeffer Location)	100
		(Tobin Location)	100
	Hematite	Amasa	400
	Iron River	Mineral Hills	234
	Mansfield	Mansfield Location	50
	Mastodon	Alpha	282
		(Dunn Location)	100
	Stambaugh	(Pentoga)	100
Marquette	Champion	(Beacon)	34.5
		Champion	450

* Indicated town appearing on maps scaled at 1" = 20 miles, for which population had to be estimated (see text).

() Indicates town appearing only on maps scaled at less than 1" = 20 miles, for which population had to be estimated (see text).

A number of very small towns did not appear on region maps at all. These are noted on the Land Use Data Map, but not in Table 2.

Table 2. (continued) POLITICAL TOWNSHIPS AND POPULATION OF TOWNS INCLUDED IN THE STUDY AREA

<u>County</u>	<u>Political Township</u>	<u>Towns</u>	<u>1970 Town Population</u>
Marquette (continued)	Chocolay	Beaver Grove Gordon Green Garden Harvey Lakewood Sand River	200 200 300 900 200 300
	Ely	(Clarksburg) Diorite (Greenwood) (S. Greenwood)	100 400 100 100
	Ewing	--	--
	Forsyth	(Austin) (Cyr) Gwinn (Little Lake) (New Swanzy) *Princeton Sawyer Air Force Base	100 100 1,054 100 100 200 5,134
	Humboldt	(Barron Mine) (Humboldt)	100 100
	Ishpeming	North Lake	400
	Marquette	(Buckroe) (Forestville)	100 100
	Michigamme	*Michigamme	200
	Negaunee	--	--
	Powell	Big Bay (Birch)	250 30.5
	Republic	Republic (S. Republic) (Witch Lake)	950 100 100

* Indicates town appearing on maps scaled at 1" = 20 miles, for which population had to be estimated (see text).

() Indicates town appearing only on maps scales at less than 1" = 20 miles, for which population had to be estimated (see text).

A number of very small towns did not appear on regional maps at all. These are noted on the Land Use Data Map, but not in Table 2.

Table 2. (continued) POLITICAL TOWNSHIPS AND
POPULATION OF TOWNS INCLUDED IN THE STUDY AREA

<u>County</u>	<u>Political Township</u>	<u>Towns</u>	<u>1970 Town Population</u>
Marquette (continued)	Richmond	Palmer	900
	Sands	Cascade Junction	200
		Gentian	200
		Sands	500
		Sands Station	200
	Skandia	*Skandia (Yalmar)	200 100
	Tilden	National Mine	700
	Turin	McFarland	51
	Wells	(Mashek) Northland (Watson)	15.4 100 15.4
	West Branch	--	--
Menominee	Faithorn	(Faithorn)	100
	Holmes	Banat Gardner Nathan	50 50 150
	Lake	--	--
	Meyer	*Cunnard Hermansville	200 700
	Nadeau	(Bagley) *Carney Nadeau	100 200 300
	Spalding	(Helps) Powers	100 560

* Indicates town appearing on maps scaled at 1" = 20 miles, for which population had to be estimated (see text).

() Indicates town appearing only on maps scaled at less than 1" = 20 miles, for which population had to be estimated (see text).

A number of very small towns did not appear on regional maps at all. These are noted on the Land Use Data Map, but not in Table 2.

Sources: 1970 U.S. Census of Population
Development Research Associates

RELATIONSHIP TO OTHER DATA

Planning

County planning commissions have established local recognition for the need to develop and the intent to pursue county-wide comprehensive land use planning. Most, if not all, of the comprehensive plans prepared by private consulting firms have been funded in part under the provisions of Section 701 of the Federal Housing Act of 1954.

Organized county-city cooperative planning efforts to promote the best utilization of land over widespread areas are evident. For instance, the Cities of Iron Mountain, Kingsford and Norway each have a separate Comprehensive Plan prepared in full coordination with the Dickinson County Comprehensive Plan. The plan was structured to include implementation as well as community research and plan preparation. Citizen liaison was involved, including public information programs, news releases about the planning program, and preparation of special technical planning reports pertaining to public services.

An integral part of Upper Peninsula planning is the inventory of natural and man-made features. The community, wherever possible, is engaged to judge the quality of existing features in the attempt to indicate areas where concentrated efforts may be necessary to resolve land use conflicts and development problems. For example, illustrative of the rural character of the Upper Peninsula Region, in 1967 only 3 percent of Dickinson County land area was classified as developed. Remaining areas were either forested, farmed, vacant, or in surface water, emphasizing the importance of natural resources upon the character of community area.

Recreation

There is an obvious relationship between the potential for recreation and the abundance of undeveloped land consisting of forest cover, lakes, streams, wildlife and pronounced seasonal change. In that the large holdings of State and Federal public lands are open to hunting, fishing, hiking, camping and other recreational pursuits with little or no restriction, public lands are shown on the Cultural and Recreational Data Map and discussed in the accompanying text.

Environment

Vegetation characteristics and varying plant associations within the Upper Peninsula provide a complex of habitats and nourishment for many types of wildlife, including those species labeled desirable by hunters. Opportunities for ecologically-oriented research activities are well known to those who have had contact with the rural and undeveloped regions of the Upper Peninsula.

Settlements

Availability of water within the Study Area varies with the geology and physiographic structure of the region. The existence of wells tapping subsurface water supplies is, to an extent, somewhat less important than availability of industrial raw materials as a determinant of settlement patterns.

Most communities have fair to good transportation access and modern means of communication. Regional surveys indicate that development tends to occur along main highways and access roads establishing a pattern of connecting minor building clusters and settlements with those of higher population density and increased commercial activity.

VALIDITY

State and county highway maps, county planning documents and detailed State Department of Natural Resources land ownership maps were initially utilized in locating rural settlements, urban settlements and cemeteries. Backup information and verification of a settlement's existence and what each settlement's geographic extent is, was provided by 15-minute USGS maps and aerial photography. Named settlements consisting of less than three buildings were not mapped for this study, while other recently established settlements appearing on the USGS maps and aerial photos were added. Circle sizes were varied to enclose the structure groupings of each settlement located.

The information for planned developments was obtained from interviews and map/plat book investigations with the Baraga County Clerk, Dickinson County Planning Commissioner, Marquette County Zoning Commissioner, Marquette and Alger County Township Associations, Dean Turner Real Estate (Dickinson County), Baraga County Equalization Department, Menominee County Registrar of Deeds, various county surveyor offices, CUPPAD, WUPPDR and other county offices.

Data relating to Special Land Use Areas shown on the Land Use Data Map and explained in this narrative were gained either through descriptive printed matter produced by the respective agencies concerned, through consultant studies prepared for those agencies, or through interviews and investigating periodicals and reports prepared by governmental units and private organizations. In the interpolation of scaled information, placement of boundaries was referenced to section lines wherever problems in accuracy were noted.

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- 1971, Map of Marquette County, Michigan, 3/4" = 1 mile

Central Upper Peninsula Planning and Development District:

- 1972-1973, Land Use Map, 1:125,000
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APPENDIX A
STATE OF MICHIGAN
LAWS RELATING TO CEMETERIES

STATE OF MICHIGAN

Laws Relating to
CEMETERIES



1968

Prepared by the
LEGISLATIVE SERVICE BUREAU
(By Authority of Act 412 of the Public Acts of 1965 and
Act 88 of the Public Acts of 1943, as amended)
for the
DEPARTMENT OF COMMERCE
CEMETERY COMMISSION

LSD-P. No. 74-11-66

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MICHIGAN DEPARTMENT OF COMMERCE

PART 5. GROUNDS, FACILITIES AND
BUILDINGS

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LAWS RELATING TO CEMETERIES

CONSTITUTION OF THE STATE OF MICHIGAN OF 1963

[Effective January 1, 1964]

Preamble.

We, the people of the State of Michigan, grateful to Almighty God for the blessings of freedom, and earnestly desiring to secure these blessings undiminished to ourselves and our posterity, do ordain and establish this constitution.

ARTICLE 7

Local Government

Parks, boulevards, cemeteries, hospitals.

Sec. 23. Any city or village may acquire, own, establish and maintain, within or without its corporate limits, parks, boulevards, cemeteries, hospitals and all works which involve the public health or safety.

U.S. NATIONAL CEMETERIES, ETC., SITES

Act 5, 1874, p. 5; Imd. Eff. March 24.

AN ACT to cede jurisdiction to the United States on certain land, and for the purchase and condemnation thereof.

*The People of the State of Michigan enact:***3.321 Purchase or condemnation of lands by the United States.**

Sec. 1. That the United States of America shall have power to purchase or to condemn, in the manner prescribed by its laws, upon making just compensation therefor, any land in the state of Michigan required for custom houses, arsenals, lighthouses, national cemeteries, or for other purposes of the government of the United States.

HISTORY: How. 5202;—CL 1897, 1149;—CL 1915, 234;—CL 1929, 410.

3.322 Same; entry, exclusive legislation, concurrent jurisdiction, exemption from taxes.

Sec. 2. The United States may enter upon and occupy any land which may have been, or may be purchased, or condemned, or otherwise acquired, and shall have the right of exclusive legislation, and concurrent jurisdiction together with the state of Michigan, over such land and the structures thereon, and shall hold the same exempt from all state, county and municipal taxation.

HISTORY: How. 5203;—CL 1897, 1150;—CL 1915, 235;—CL 1929, 411.

UNITED SPANISH WAR VETERANS

Act 174, 1931, p. 274; Imd. Eff. May 27.

AN ACT to incorporate the United Spanish War Veterans, Department of Michigan, and subordinate camps of the United Spanish War Veterans.

*The People of the State of Michigan enact:***35.277 Same; joint erection of buildings; cemeteries.**

Sec. 7. Any corporation formed in pursuance of this act may erect and own such suitable memorial edifice, building, or hall, as to such corporation may seem proper for its purpose, and it may, if so desired, create for that purpose a capital stock of not more than 100,000 dollars, to be divided into shares of not more than 10 dollars each, which said

PIPE LINE COMPANIES

Act 182, 1881, p. 215; Imd. Eff. May 31.

AN ACT to provide for the incorporation of pipe line companies, and to define their powers and duties.

The People of the State of Michigan enact:

483.218 Construction restrictions.

Sec. 18. No company formed under the provisions of this act shall locate or construct any line of pipe or pipe line through or under any building, door-yard, lawn, garden or orchard, except by the consent of the owner thereof in writing, duly acknowledged before some officer duly authorized to make acknowledgment of deeds; and no pipe line shall be constructed through any cemetery or burial ground, nor within 100 feet of any building except that in cases where such line is authorized by public officers to be laid across or upon any public highway, or where the same is laid across or upon any railroad or plank road, the above restriction shall not be applicable, and in all cases hereby excepted; and such pipe line shall be located with all reasonable care and prudence, so as to avoid danger from bursting the pipes.

HISTORY: How. 3741;—CL 1897, 6498;—CL 1915, 8604;—CL 1929, 11621.

GIFTS, GRANTS, BEQUESTS AND DEVISES

Act 280, 1915, p. 496; Eff. Aug. 24.

AN ACT to establish the validity and to provide for the administration and control of gifts, grants, bequests and devises to religious, educational, charitable or benevolent uses, or for cemeteries, whether in trust or otherwise, which would be otherwise invalid by reason of indefiniteness or uncertainty of the object of such trust or of the persons designated as the beneficiaries thereunder in the instrument creating the same or by reason of contravening any statute or rule against perpetuities; and regulating the same; to establish the validity of all gifts, grants, devises or bequests made in pursuance of Act 122 of the Public Acts of 1907 and of the acts amendatory thereof, and all proceedings and acts performed in accordance therewith; and repealing Act 122 of the Public Acts of 1907, and all amendments thereto.

The People of the State of Michigan enact:

554.351 Gift or grant for certain purposes; effect of indefiniteness, vesting of title, appointment of trustee.

Sec. 1. No gift, grant, bequest or devise, whether in trust or otherwise to religious, educational, charitable or benevolent uses, or for the purpose of providing for the care or maintenance of any part of any cemetery, public or private, or anything therein contained which shall in other respects be valid under the laws of this state, shall be invalid by reason of the indefiniteness or uncertainty of the object of such trust or of the persons designated as the beneficiaries thereunder in the instrument creating the same, nor by reason of the same contravening any statute or rule against perpetuities. If in the instrument creating such a gift, grant, bequest or devise, there is a trustee named to execute the same, the legal title to the lands or property given, granted, devised or bequeathed for such purposes, shall vest in such trustee. If no such trustee shall be named in said instrument or if a vacancy occurs in the trusteeship, then the trust shall vest in the court of chancery for the proper county, and shall be executed by some trustee appointed for that purpose by or under the direction of the court; and said court may make such orders or decrees as may be necessary to vest the title to said lands or property in the trustee so appointed.

HISTORY: CL 1915, 11099;—CL 1929, 13512.

FORMER ACT: Act 122 of 1907.

APPENDIX B

WATERSHED WORK PLAN
EAST BRANCH, STURGEON RIVER WATERSHED
(excerpts)

WATERSHED WORK PLAN

EAST BRANCH STURGEON RIVER WATERSHED

Dickinson County, Michigan.

Prepared Under the Authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666), as amended.

Prepared by: Dickinson Soil Conservation District

Dickinson County Road Commission

East Branch of the Sturgeon River
Water Users Association

With assistance by:

U. S. Department of Agriculture, Soil Conservation Service

U. S. Department of Agriculture, Forest Service

February 1966

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WATERSHED WORK PLAN

EAST BRANCH STURGEON RIVER WATERSHED

Dickinson County, Michigan

February 1966

SUMMARY OF PLAN

The work plan for the East Branch Sturgeon River Watershed was prepared by the Dickinson Soil Conservation District, the Dickinson County Road Commission, and the East Branch of the Sturgeon River Water Users Association as sponsoring local organizations with assistance provided by the Soil Conservation Service and the Forest Service of the U. S. Department of Agriculture.

The watershed, which has an area of 83,980 acres (131.2 square miles), is located in the central portion of Dickinson County in the Upper Peninsula of Michigan. It is about 20 miles northeast of Iron Mountain, Michigan. The watershed is located within the area included in the Upper Great Lakes Economic Development Region, established under the authority of the Public Works and Economic Development Act of 1965. Project measures are consistent with the needs of the area and are complementary to long-range multiple use goals which have been developed by local planning agencies.

There are an estimated 50 farms in the watershed which vary a great deal in size, but average approximately 200 acres per farm. The farms are concentrated mainly near the small, unincorporated communities of Felch, Foster City and Hardwood. Principal crops grown are hay, oats, and Irish potatoes. The farms formerly were engaged primarily in the production of livestock and dairy products. Recently, however, livestock numbers have decreased rapidly and the acreage of potatoes has increased sharply. There are presently 46 landowners in the watershed who are cooperators with the Dickinson Soil Conservation District.

The principal problems in the watershed are the flooding of agricultural and non-agricultural property and improvements including transportation facilities, the need for irrigation water by potato growers in the Foster City - Hardwood area, and a need for expansion and rehabilitation of valuable recreational resources. Other problems, such as the unemployment and under-utilization of labor resources, have been recognized, as indicated by the designation of Dickinson County under the Area Redevelopment Act of 1961, and its inclusion in the Upper Great Lakes Economic Development Region. This is further exemplified by the cooperation among the sponsoring local organizations, the Michigan Department of Conservation, the U. S. Department of Agriculture, and the Economic Development Administration of the U. S. Department of Commerce, in development of the work plan and making arrangements for assistance in financing local costs.

Land use in the watershed is predominantly non-farm woodland, which comprises approximately 87 percent of the area. Of this, 36,500 acres are under State ownership in the Sturgeon River State Forest, with the remainder being primarily in private ownership. The remainder, or 10,920 acres, which is considered as land in farms is comprised of approximately 38% cropland, 54% woodland, 4% pasture and 4% idle and miscellaneous.

To provide for the watershed needs of flood protection, irrigation, and recreation, this work plan provides for the installation of three multiple-purpose structures. These structures along with the land treatment measures will reduce floodwater damages by approximately 80 %. The structures will temporarily store 7,100 acre feet of excess runoff. The structures will also provide 1,015 acre feet of irrigation water for 695 acres of potatoes. This amount of storage will meet demand requirements nine out of ten years. In addition, approximately 1,770 surface acres of permanent recreation water will be provided, as well as basic recreational facilities for use in conjunction with these water areas.

The total average annual benefits from the multiple-purpose project are estimated to be \$51,099, of which \$7,120 are local secondary benefits.

By providing flood protection, irrigation water, and recreational areas, the project complements the Overall Economic Development Plan for Dickinson County as prepared by the Dickinson County Planning Commission. The increase in agricultural income from the irrigation benefits will make a needed contribution to the objectives of rural area development. The recreational areas will increase tourism, as well as serve the needs of local residents. The utilization of unemployed and underemployed labor in project installation and operation and maintenance will also stimulate the local economy.

The land treatment measures to be installed include all appropriate measures having hydrologic significance in reducing flooding or that contribute to achieving the planned agricultural water management benefits from irrigation. These measures will be installed by individual landowners and on State lands at an estimated cost of \$184,670. Additional technical assistance to accelerate the planning and application of land treatment measures will be provided from PL-566 funds at an estimated cost of \$90,860. These funds are in addition to the technical assistance costs of \$57,170 which will be provided by the "going" programs.

The total installation cost for structural measures is estimated to be \$300,430, of which the PL-566 share is \$107,583 and the other than PL-566 share is \$192,847. The average annual operation and maintenance cost for structural measures, including sufficient funds for periodic replacement of basic recreational facilities, will be provided by the local sponsoring organizations at an estimated cost of \$9,330.

The benefit-cost ratio for structural measures is 2.7 to 1.0. When local secondary benefits are excluded, the benefit-cost ratio is 2.3 to 1.0.

Market values for agricultural land range from \$100 to \$200 per acre, depending primarily upon factors such as soil, slope, location, present use, etc.

There are approximately 50 farms in the watershed which average 200 acres in size. There are, presently, 46 landowners with nearly 8,060 acres who are cooperators with the Dickinson Soil Conservation District. Of these, 36 have basic conservation plans on 6,980 acres. These conservation plans were the basis for the application of basic land treatment measures which have been applied. These measures have been applied in accordance with the basic capability of the land and good management. These measures are itemized in Table 1A.

The watershed is primarily in woodland, which comprises approximately 93% of the area. Of the remainder, 5% is cropland, and the remaining area is about equally divided between pasture and other uses. Cropland is expected to increase by approximately 600 acres, or 0.7%. The additional 1,772 acres of permanent water storage to be created by project measures, representing 2.1% of the watershed area, is presently in woodland, much of which is swamp.

WATERSHED PROBLEMS

Floodwater Damage

The most severe floods normally occur in the late winter or early spring as a result of combined snowmelt and excess rainfall. These conditions do not produce "flash" floods, but instead cause high stages and flooding conditions which persist for prolonged periods, usually several days. These flood flows are especially damaging to road fills and bridge abutments.

The major floodwater damage occurs in the reach downstream from Structure No. 2 in the Foster City - Hardwood area. In the floodplain reach between Structures Nos. 1 and 2, numerous private road bridges which cross the channel, and are used in logging operations, are frequently damaged or destroyed by floodwaters.

The flood of May 1960 resulted from combined snowmelt and heavy rainfall. This flood, estimated to be a 10-year frequency, caused severe damage to two highway bridges near Foster City. One of these bridges had to be rebuilt, and the other extensively repaired. The road fill of former Highway M-69 between Foster City and Hardwood was damaged, as was the railroad fill on the opposite streambank. Four rural residences in this area were also flooded. In the reach downstream from Structure No. 1, four logging road bridges were destroyed. Damage from this flood was estimated to be in excess of \$10,000.

Sediment and Erosion Damage

Erosion and sediment problems were investigated and present silt movement was determined to be minor. It was concluded that the damage was not of sufficient magnitude to warrant further detailed investigations.

Problems Relating to Water Management

There is a need for a continuous water supply during the growing season for supplemental irrigation of potatoes. The potatoes grown in this area are of the Russet Burbank variety which are sold at premium prices to meet special demands for baking purposes. Supplemental sprinkler irrigation of potatoes on about 75 acres in the Foster City - Hardwood area has increased yields substantially and has produced a higher percentage of No. 1 potatoes. Under present conditions, the uncontrolled base flow in the river is relatively low and somewhat variable during the growing season, posing a serious limitation on the amount of water that can be withdrawn for irrigation purposes. A dependable water supply for sprinkler irrigation use in this specialized type of farming would serve to insure a more uniform annual production of high quality potatoes and would make a needed contribution to the objectives of rural area development.

Dickinson County has no Great Lakes frontage and only a few small inland lake areas, most of which do not have public access. To fully utilize the recreation potential of the watershed it is essential that the water resource be conserved and improved. Present conditions of overbank flooding, extreme fluctuation in river flow and water temperature, and lack of facilities for fishing, boating and swimming limit the possibilities for meeting the increasing need and demand for recreation.

PROJECTS OF OTHER AGENCIES

There are no known projects for water resource development of other agencies that would affect or be affected by the works of improvement proposed in this work plan for installation in the East Branch Sturgeon River Watershed.

BASIS FOR PROJECT FORMULATION

The local sponsoring organizations outlined their project objectives prior to the initiation of detailed watershed surveys and investigations. These objectives included the development and carrying out of an accelerated soil and water conservation program in the watershed. This phase of the program was recognized as a necessary complement and first increment to the structural measures to be planned. It was a further objective that the land treatment program should be supplemented, as necessary, with dams such that (1) flooding due to excessive runoff would be held to a minimum and (2) sufficient water would be stored during high flows to give 9 out of 10 years protection for the irrigation of potatoes. It was also an objective that dams incorporate storage capacity for recreational purposes.

The watershed was studied to identify potential multi-purpose structure sites. These studies indicated that there were three sites most likely to make a maximum contribution to the attainment of project objectives. These sites were selected on the basis of: (1) their proximity to floodwater damage areas, (2) storage capacity, and (3) cost of installation.

APPENDIX C

ESTABLISHMENT REPORT FOR
McCORMICK RESEARCH NATURAL AREA
WITHIN THE
OTTAWA NATIONAL FOREST

ESTABLISHMENT REPORT
FOR
McCORMICK RESEARCH NATURAL AREA
WITHIN THE
OTTAWA NATIONAL FOREST
Marquette County,
Michigan

Principal distinguishing features

The Research Natural Area includes about 3,675 acres in the northeast corner of the Cyrus H. McCormick Experimental Forest. The Area contains examples of virgin northern hardwood-white pine, an increasingly rare type in the northern hardwood group. Mature stands of the northern hardwood climax growing on sandy soil are also exceedingly rare and much of the Area contains examples of this.

The topography and soils are distinctly varied. Combinations of aspect and elevation lead to large changes in the microenvironment. In the western and northeastern portions there are relatively flat sandy outwash plains separated by a rugged escarpment about 3/8-mile wide. Cataracts occur on both the main and west branches of the Yellow Dog River in the escarpment area. The hilly terrain of the southern portion includes the Area's highest point, 1,860 feet, located on the divide between the Yellow Dog River and Lake Margaret. In the rugged sections the glacial till is often so thin that bedrock is exposed. The lowest point (1,480 feet) is at the exit of the Yellow Dog River at the northeast corner.

The main and west branch of the Yellow Dog River pass through the Natural Area. Almost all of the drainage basin for these streams lies within the Experimental Forest and much of the watershed also is within the Natural Area. There are 5-1/2 miles of stream in the Area, a small lake (5 acres), and Lake Margaret (120 acres).

Location

The proposed Natural Area is about 30 miles northwest of Marquette, Michigan. The boundaries coincide with those of the Experimental Forest along the east and north sides. Along the west side, the boundary lies along the Old Huron Mountain Trail from the north Forest line to a divide just north of Bulldog Lake, around the east end of this lake and south around Lake Margaret. The southern boundary follows the south side of Sections 32 and 33 to the east property line.

The area's legal description is:

<u>Section</u>	<u>Subdivision</u>
17	S1/2
18	SE1/4 NE1/4; and portion of S1/2 east of the Old Huron Mountain Trail
19	E1/2; and portion of W1/2 east of the Old Huron Mountain Trail
20	Entire section
21	W1/2 NW1/4; NW1/4 SW1/4
29	Entire section
30	Portions east of Old Huron Mountain Trail, and north of divide through SE1/4
31	SE1/4 NE1/4; E1/2 SE1/4
32	Entire section
33	W1/2; SW1/4 SE1/4

All sections are within Township 50 North, Range 29 West. The entire Natural Area is in federal ownership.

The Area can be reached by boat over White Deer and Bulldog Lakes. Temporary access is also possible over spur logging roads on private lands along the north and east boundaries. Within the Area itself, there are about 14 miles of lightly-used trails that provide good access to much of the tract.

Area by cover types

A timber type map has been prepared at the scale of 4 inches per mile based on aerial photos (fig. 2). These are of the EMP series dated June 25, 1964. Approximate areas by cover types are:

Type	Acres
Northern hardwood (old growth)	2,460
Northern hardwood (second growth)	90
Northern hardwood-conifer (old growth)	230
Northern conifer (old growth)	125
Lowland conifer (poles)	500
Lowland conifer (seedling-sapling)	5
Swamp (Non-commercial shrubs)	140
Water (Groves Lake and Lake Margaret)	<u>125</u>
TOTAL	3,675

The northern hardwoods types are dominated by sugar maple (SAF type 27-sugar maple). The mixed hardwood and conifer types include varying amounts of white pine and hemlock. Black spruce dominates in the lowland conifer type (SAF type 12).

Mean monthly temperatures vary from 12-14° F. in the January-February period to 60-65° F. in the June-August period at Champion and Alberta Park. Maximum temperatures have not exceeded 100° F. and the record minimum for the stations is -40° F.

Description of Values

(1) Flora

The plant community descriptions and developmental series described by Braun^{1/} for the Huron Mountains and Baraga County are applicable to the Natural Area. Forest types are either climatic or edaphic climax. Early seral communities of elm-black ash and maple-elm-basswood-yellow birch are small in area.

Plant communities in the Area are relatively undisturbed; no cutting has occurred for more than 50 years. Much of the tract appears to be in its original state, but light cutting may have taken place in a small area close to Bulldog Lake.

The occurrence of the northern hardwood types over a variety of soils, aspects and elevations provides the opportunity for a variety of ecological studies. Mature and untouched examples of these types on such a wide variety of soil and microenvironment are now very rare.

The Natural Area is large enough to provide an adequate isolation zone. Such a zone is needed on the northern and eastern boundaries only. Anticipated research activities outside of the Natural Area on the west and south will not conflict.

^{1/} Braun, E. L. 1964. Deciduous forests of eastern North America. Hafner Publishing Co., New York. p. 365-371.

Vegetation within the Natural Area is comparable with that on much of the northern half of the Experimental Forest. The vegetation is also representative of types and subtypes common throughout the region.

(2) Geology

Glaciation last occurred in the area during the Valders substage, about 10,000 years ago.^{2/} Surface features and soils are derived from deposits of glacial till and outwash. The tills, however, are usually shallow and depth to bedrock has greatly influenced surface and soil conditions.

Much of the bedrock is gneiss of various forms deposited early in the Precambrian Era.^{3/} Diabase dikes and irregularly shaped bodies of metadiabase and metagabbro extensively cut the older bedrock. These features are oriented east-west along their main axes. At the northern end of the area the rock is from middle Precambrian time. These rocks are metasedimentary and metavolcanic and contain slates, graywacke and a thin iron formation. Detailed mapping has not been done in the Area.

^{2/} Martin, H. M. 1957. Map of surface formations of the Northern Peninsula of Michigan. Mich. Geol. Surv. Div. Publ. 49.

^{3/} Case, J. E., and J. E. Gair. 1965. Aeromagnetic maps of parts of Marquette, Dickinson, Alger, and Schoolcraft Counties, Michigan and its geologic interpretation. U.S. Geol. Surv. Geophysical Inv. Map GP-467. 10 p + 3 maps.

Podzolic soils predominate (soils map attached). The prominent series within the area are Karlin, Champion and Michigamme. Smaller amounts of Kalkaska and Pence are present. Carbondale-Linwood organic soils are limited to depressions and stream bottoms. The parent material for the Karlin and Kalkaska series is light colored sand, possibly of outwash origin. The Champion and Michigamme soils are derived from darker colored loamy sands to sandy loams. Important distinguishing features of these soils are:

<u>Series</u>	<u>Feature</u>	<u>Depth</u>
Michigamme	Bedrock	20-40"
Champion	Weakly developed fragipan	28-32"
Karlin	Textural bands	42-60"
Kalkaska and Pence	No obstruction	-

The variability of the soils (from deep sands to shallow to bedrock soils) supporting mature climax forest gives a unique opportunity to compare the influence of variations in soil factors on the ecology of northern hardwoods within a limited area.

Recommendation

The proposed Research Natural Area contains good examples of the virgin northern hardwood-white pine type and of the northern hardwood type growing on sandy soils. The Area will be valuable for scientific and educational use and is large enough to provide the essentially undisturbed conditions necessary for long-term ecological studies. It is recommended that the area described in this report be established and designated as the "McCormick Research Natural Area."

4/24/70

Date

J. Bryan Clark

Reporting Officer

4/27/70

Date

E. S. King

Director, North Central Forest
Experiment Station

5/12/70

Date

J. D. Johnson

Supervisor, Ottawa National Forest

6/18/70

Date

J. S. James

Regional Forester

APPENDIX D
GUIDE TO THE
UPPER PENINSULA EXPERIMENTAL FOREST

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PERMIT FULL LEGIBLE REPRODUCTION

GUIDE

to the

UPPER PENINSULA EXPERIMENTAL FOREST 1/

DESCRIPTION OF THE EXPERIMENTAL FOREST

What Is An Experiment Station

Agricultural experiment stations have long been in existence in this country in order that farming methods and farm crops might be improved. Each state in the Union, assisted by the United States Department of Agriculture, now maintains one or more stations wholly devoted to agricultural research. Timber, like wheat, corn, and clover, is also a soil crop, but with the important difference that it takes a great many years to mature a stand of trees whereas most farm crops are sown and harvested within one year. It is only natural that as the forestry movement has gained greater impetus in this country, the need for experiment stations to investigate and solve the problems of our forest crops should be recognized.

Several of the agricultural experiment stations and also some of the state colleges and forest schools carry on experiments in forestry. The most comprehensive work in the field, however, is done by the federal Forest Service through its eleven regional forest experiment stations throughout the United States. Each of these stations, in cooperation with the local forest agencies, works on the problems of the forest region in which it is located, a region generally composed of several states with more or less uniform climate, forest growth, and economic conditions.

The Lake States region, consisting of Michigan, Wisconsin, and Minnesota, is served by the Lake States Forest Experiment Station with headquarters at the University of Minnesota, University Farm, St. Paul. This Station carries on forest investigations in all three states within which there are 55 million acres of forest land. A large part of the work is done through branch or field stations which consist of an experimental forest and all the necessary equipment for its management and administration. Experimental forests are as necessary a part of forest experiment stations as experimental farms are of agricultural experiment stations, for it is here that all kinds of forest practices — cuttings, thinnings, plantings, and the like — may be tried out and their effects carefully observed, recorded and evaluated. One such forest is the Upper Peninsula Station located in the heart of the hardwood timberlands which cover so large a part of northern Wisconsin and the Upper Peninsula of Michigan.

Only a brief outline of the work of the Upper Peninsula Experimental Forest is presented in this circular. For further information on any of the Station's activities or other questions relating to forestry, write "Upper Peninsula Experimental Forest, Dunes, Michigan."

Visitors are always welcome on the Station Forest.

Location of the Experimental Forest

The Upper Peninsula Experimental Forest is located at Dukes, Marquette County, about 20 miles southeast of the city of Marquette. It consists of a tract of forest land of somewhat over 5,000 acres extending along Highways M-94 and U.S.-41.

How It Was Established

The Experimental Forest was established in 1926 with the donation of 640 acres of land by the Cleveland-Cliffs Iron Company. Half of this land was in young second-growth. This was deeded outright. On the other half, which supported old-growth timber, the land was deeded to the Government but with the understanding that the Station would be allowed 20 years (later extended to 40 years) in which to return to the Company a volume of timber equivalent to the merchantable volume on the area in 1926, the date of the deed.

The Upper Peninsula Development Bureau was very active in sponsoring the establishment of the Experimental Forest. The Michigan Conservation Department gave financial assistance in constructing the first building.

In 1935 the Station was enlarged to nearly its present size through purchase by the Federal Government of over 4,000 acres of additional timberlands. At the same time the tract was given National Forest status. Subsequently several small tracts have been added and additional ones will be acquired as opportunity is afforded.

The Experimental Forest is maintained by federal appropriations to the Forest Service, U. S. Department of Agriculture.

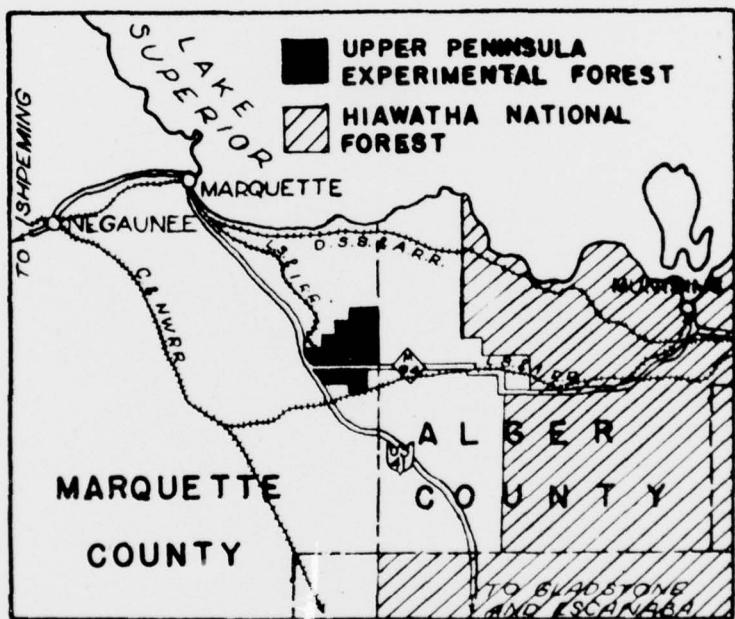
Character of the Experimental Forest

The Experimental Forest is made up of the following forest types:

Forest Types ^{1/}	Area	
	Acres	Percent
1. Northern hardwood	2,295	42.6
2. Hardwood-hemlock	713	13.2
3. Hemlock	76	1.4
4. Aspen.....	28	.5
5. Hardwood-swamp	1,416	26.2
6. Black spruce-cedar swamp	628	11.6
7. Misc. non-forested areas	242	4.5
Total	5,398	100.0

^{1/} As of 1945.

The only common forest types of the Upper Peninsula not found on the Experimental Forest are the pine types which occur on sandier soils. Descriptions of the existing types follow:



Location of Upper Peninsula Experimental Forest at Dukes, Michigan in relation to main highways and railroads.

1. Northern hardwood. Sugar maple (hard maple) is the most common tree of this type, forming 61 percent of the number of trees 5 inches d.b.h. and over and 68 percent of the merchantable volume. Yellow birch is second in importance. Hemlock occurs as an occasional tree in this type. Red maple, elm, basswood, beech, black ash, balsam fir, and white spruce are also found but are scattered. The forest is made up of trees of all sizes from innumerable small seedlings a few inches high up to old veterans 100 feet high and 40 inches in diameter at breast height (4-1/2 feet above the ground), and from 200 to 300 years old. Virgin stands of hardwoods averaged about 9,000 feet B.M. on the tract but the average managed stand will run somewhat less. The hardwood type is the most valuable and important one on the Forest. Most of the experiments carried on are directed toward finding the best method of handling it.
2. Hardwood-hemlock. In this type hemlock frequently comprises as much as 50 percent of the merchantable volume. The hardwoods are inferior in quality to those in the hardwood type. Red maple is quite common. The type is found on upland soils but often bordering swampy areas where the water table is high.
3. Hemlock. Hemlock is found particularly on low knolls and ridges scattered through swampy areas. Hemlock makes up about three-fourths of the volume. The balance is largely red maple and yellow birch, with a small scattering of white pine.
4. Aspen. Aspen (popple) often comes in abundantly after fire. It also sometimes seeds in heavily after clear cutting of the hardwoods, such as occurred on some areas on the Experimental Forest. It is being crowded out by an understory of maple.
5. Hardwood swamp. In the border zone between upland and swamps and on some of the poorly drained flats, black ash, yellow birch, sugar maple, elm, and other hardwoods grow in mixture with hemlock, balsam fir, white spruce, and cedar.
6. Black spruce-cedar swamp. The swamp conifers -- black spruce and cedar -- are the characteristic trees of the peat swamps. Tamarack, formerly one of the dominant trees of the swamps, was largely killed out 30 years ago by the larch sawfly, but is now coming back where alder has not taken over the site.

Past History

With the exception of about 1,300 acres which had recently been cut over, most of the Experimental Forest was essentially an old-growth stand at the time the Station took over its management. The northern hardwood type, however, had been lightly culled for elm and basswood during the period 1906 to 1910. No evidence of recent forest fires is found on the tract.

Climate

The Experimental Forest lies within the heavy snow belt of the Upper Peninsula. Precipitation averages about 34 inches per year, one-third of which falls as snow. Over a period of 15 years, during which complete climatological records were maintained, the highest temperature noted on the Forest was 102° F.; the lowest -42° F. Such extremes are rare, however. The mean temperature for the growing season, June 1 to September 30, is 60° F.

Soils

The forest tract is generally level in character, broken only by small knolls, swampy depressions, and shallow stream courses. Over most of the area the soil is a sandy loam, usually gravelly and stony, especially beneath the surface layer where it grades into the glacial drift. Well drained or upland soils are found on the higher benches, knolls, and gentle slopes. These soils are of two distinct types.

In one, the layer of soil near the surface is distinctly leached out, being grayish in color, and is underlaid by a cemented or "hard pan" layer one to three feet below the surface. In the other, these features are entirely lacking or are very indistinct. Growth is better on the soil lacking the hard pan.

Poorly-drained and low-lying soils are also present. They show many gradations, from soils almost similar in character to the upland soils but with the ground water nearer the surface, to the deep peat soils of the swamps. The forest growth accordingly varies from swamp hardwoods to the spruce-cedar swamps.

Protection and Administration

Since the Experimental Forest has National Forest status, it is given fire protection by the Upper Michigan National Forest much in the same manner as a small ranger district. The lookout tower is manned during periods of high fire danger and fire fighting equipment is kept in readiness for instant use.

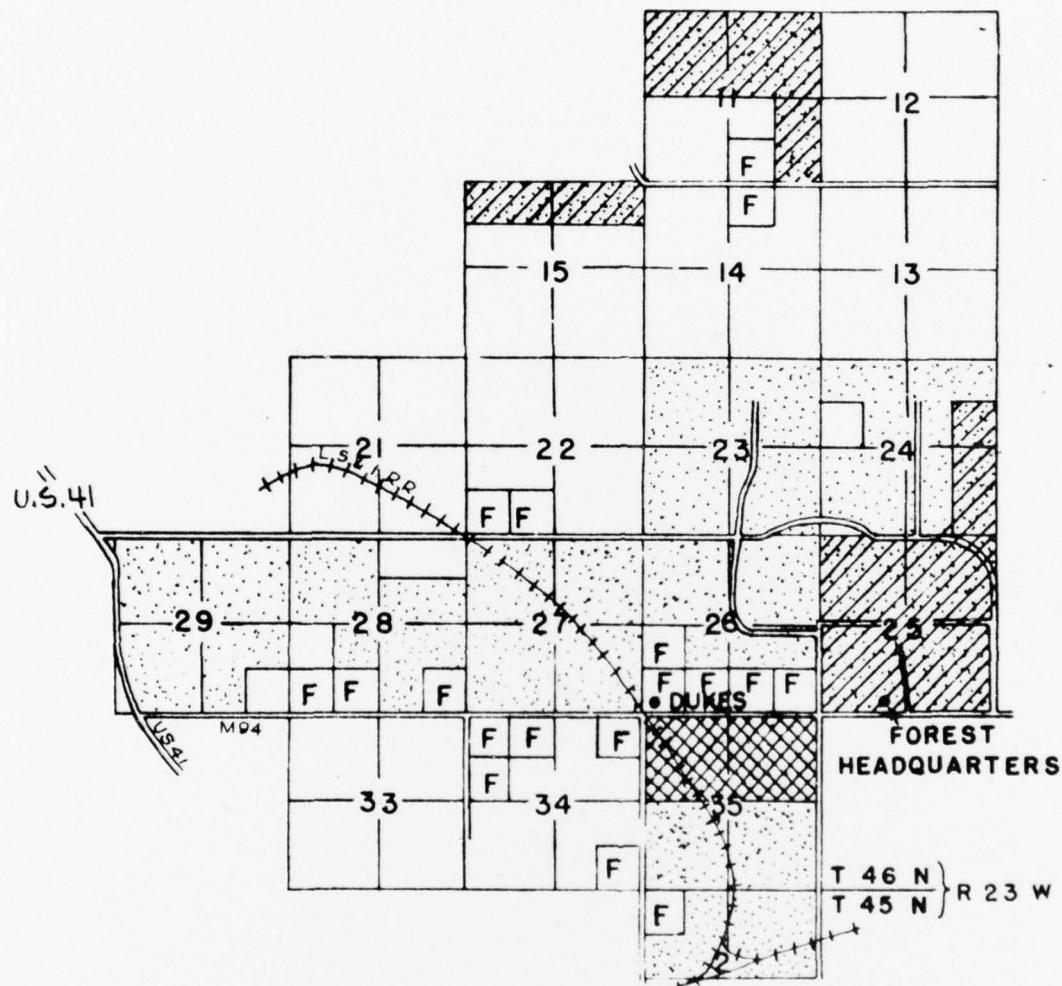
With the exception of 320 acres of the original Forest, which is handled under cooperative agreement with the Cleveland-Cliffs Iron Company, the timber on the Experimental Forest is cut and sold under national forest timber sales procedure in cooperation with the Upper Michigan National Forest.

Road System

The Experimental Forest is well provided with main hauling roads, either through existing State highways, county roads, or roads constructed by the Forest Service (see map). In addition, a system of low standard logging roads makes the area very accessible for utilizing the timber crop.

Markets

The Experimental Forest is well situated as to markets. Woodenware factories, veneer plants, and sawmills utilizing the better grades of hardwoods are located in Marquette, Munising, Gladstone, and Escanaba. The iron mines in the Negaunee-Ishpeming area use large quantities of hardwood mine timbers, thus furnishing a market for small low-grade logs. The chemical plant in Marquette provides an outlet for the cull hardwood logs and larger limb wood. The pulp and paper mills in Munising and Escanaba require large quantities of pulpwood. Several small portable sawmills in the vicinity produce lumber and railroad ties. In addition to these relatively local markets, good railroad connections make it possible to ship veneer logs and pulpwood to Wisconsin and elsewhere at some distance from the Experimental Forest.



- FEDERAL OWNERSHIP
- SECOND GROWTH STANDS
- METHODS OF CUTTING STUDIES (COOP. WITH CLEVELAND-CLIFFS IRON CO.)
- FARM LANDS
- PRIVATE OWNERSHIP (NON FARM)

UPPER PENINSULA EXPERIMENTAL FOREST
DUKES, MARQUETTE CO. MICHIGAN

WORK OF THE EXPERIMENTAL FOREST

The main objectives of management of the Upper Peninsula Experimental Forest are (1) investigation of forest problems, (2) demonstration of the possibilities of sustained yield, and (3) maintenance of a permanent local forest community.

Investigation of Forest Problems

At the Upper Peninsula Experimental Forest effort is being made to develop and demonstrate better methods of handling forest lands and forest crops in the northern hardwood region. Just what some of the forestry problems are and how they are being solved may be made clearer by enumerating some of the things which the Station is doing.

A. Trying out various methods of cutting in old growth. On some areas the forest has been cut clean, on others only the largest trees were taken, on still others only the deformed and defective trees were cut, and so on. In the mature northern hardwood forest, eight different schemes have been tried out so far. Some of the same methods have been repeated. On the accompanying map will be found the location of the areas treated. (Map)

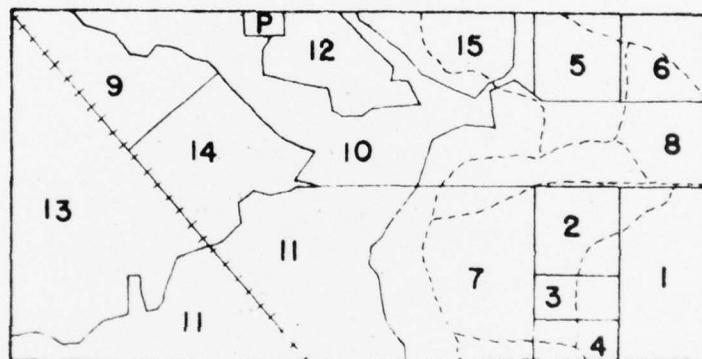
On each of these trial cuttings permanent sample plots have been established on which the trees are measured as to height and diameter. The trees are each identified with a different number. Measurements are taken periodically and the young growth carefully recorded. In this way a record is kept as to what method of cutting results in faster growth of the remaining trees and quicker regeneration of the cutover land.

Descriptions of the various cuttings and some of the results obtained are indicated below:

1. 22-inch diameter limit. First cutting, 1926: Only the largest and most mature trees were removed -- mostly over 22 inches in diameter. Second cutting, 1943: A light selection of defective trees was made, regardless of diameter. Growing at the rate of 188 board feet per acre per year for 17 years, this unit had a greater merchantable volume at the time of the second cutting in 1943 than was present originally in 1926.
2. Overmature and defective No. 1. Cut in 1927. All defective and overmature trees were removed, irrespective of size or spacing. Good growth, low mortality, and fair quality have resulted from this cutting.
3. 12-inch diameter limit. Cut in 1927. This was a clear cutting of all sawlog timber, corresponding to a commercial clear cutting operation. Chemical wood in tops and cull-trees 12" and larger was utilized. Reproduction is abundant with good species representation, but it will be many years before much volume can again be removed.
4. Clear Cutting. Cut in 1927. Everything merchantable, including sawlogs, mine timbers, tie cuts and cordwood, was cut and removed from the area. Here again the chief disadvantage seems to be the long wait for future cutting.

METHODS OF CUTTING STUDIES
In cooperation with
Cleveland-Cliffs Iron Co.

N $\frac{1}{2}$ of Sec. 35



1. 22 Inch Diameter Limit
2. Overmature and Defective, No. 1
3. 12 Inch Diameter Limit
4. Clear Cutting
5. Heavy Improvement
6. Light Improvement
7. Group Selection
8. 70 Percent Selection
9. Overmature and Defective, No. 2
10. Sanitation and Salvage, No. 1
11. Sanitation and Salvage, No. 2
12. Light Selection, No. 1
13. Light Selection, No. 2
14. Light Selection, No. 3
15. Virgin Forest Reserve Area
- P Private Ownership
- +— Railroad
- Trails

5. Heavy improvement. Cut in 1928. A moderately heavy cutting of overmature and defective trees was made, irrespective of size or spacing. Low mortality, fairly good growth, and an early second cutting are the chief advantages of this treatment.
 6. Light improvement. Cut in 1928. This was an extremely light cutting of overmature and defective trees, regardless of diameter. A second cutting of higher quality is possible at any time.
 7. Group selection. First cutting, 1929: Groups of trees covering areas from one-tenth to one-half acre were clear cut, and an extremely light salvage cut was made in the remaining stand. Second cutting, 1944: A light improvement cutting between the openings was made, and some of the clear cut areas enlarged. This type of cutting was designated to stimulate the seeding in of yellow birch, and in this respect it has been successful.
 8. 70 percent selection. Cut in 1930. A heavy selection cutting based on spacing rather than condition of residual trees was carried out on this unit. The basis of selection employed left trees of poor risk in the residual stand, resulting in rather heavy mortality.
 9. Overmature and defective No. 2. Cut in 1932. All overmature and defective trees were removed, regardless of size or spacing. The treatment, similar to that employed in No. 2 above, has in this case resulted in even better growth and lower mortality.
 10. Sanitation and Salvage No. 1. Cut in 1933. Old or decadent trees were cut, together with all dead cedar.
 11. Sanitation and salvage No. 2. Cut in 1934. Old or decadent trees and dead cedar were cut. In addition a light selection cutting was made on small areas of cedar and black spruce type.
 12. Light selection No. 1. Cut in 1937. This was a light cutting of overmature and defective trees, removing 34 percent of original volume.
 13. Light selection No. 2. Cut in 1938 and 1939. Here again a light cutting of overmature and defective trees was made, removing 37 percent of the original volume.
 14. Light selection No. 3. Cut in 1939. 40 percent of the original volume was removed in a light cutting of overmature and defective trees.
 15. Virgin Forest Reserve Area. A block of about 9 acres of virgin northern hardwood timber was set aside as a check plot in 1927 with which to compare growth and mortality on the treated units.
- B. Management studies in second growth. The rapid depletion of old-growth timber in the Lake States makes a shift in emphasis in the work of the Experimental Forest toward the management of second-growth stands inevitable. Most cutover areas in the region bear some kind of forest cover, though often inferior to the original stands in species and stocking. The problem of securing maximum production from these lands through the proper coordination of protection, reforestation and cultural measures, consistent with economic considerations, will be given increased attention.

Four 10-acre blocks of second-growth northern hardwoods in the south half of Section 25 have been given different types and degrees of cleaning, thinning and liberation cuttings. Subsequent examinations will disclose whether or not improved stand composition and increased growth following any of these operations have been sufficient to justify costs of treatment.

The 1,300 acres of second growth of varying age and condition on the Experimental Forest, with indications that more will be acquired from time to time, provide ample area for experimentation. Permanent sample plots will be established throughout this area as the basis for growth and management studies.

- C. Farm woodlot demonstration. In one of the second-growth northern hardwood areas of the Experimental Forest it is planned to lay out an average size farm woodland -- about 50 acres for this part of Upper Michigan. Management of this unit as a woodlot to furnish the wood supply for Forest Headquarters or along similar lines will be an object lesson in the care of woodlands for neighboring farmers.
- D. Wildlife in its relation to forests. In cooperation with the U. S. Fish and Wildlife Service, through its biologist assigned to the Station, studies are being carried on of the benefits and injuries to the forest caused by deer, snowshoe hare, beaver, and other mammals and birds.
- E. Diseases and insect enemies of the forest. The Experimental Forest is available as a center of observation on work of this sort which is carried on primarily by the U. S. Bureau of Plant Industry, Soils and Agricultural Engineering and by the Bureau of Entomology and Plant Quarantine. There is still a wide field for further investigation, as too little is known of the effect on forest management of the wood-rotting fungi, canker diseases, leaf blights, and the numerous leaf-eating insects, bark beetles, and borers that are common to the forests of this region.
- F. Marketing and utilization studies. In the administration of timber sales on the Experimental Forest every effort is made to direct material removed into products of greatest value. Cutting of short logs, with its more complete utilization, is generally practiced on the area. Records and observations are maintained of products resulting from the different cuttings as a guide for future operations.

Studies of cull and its reduction in the stand by various methods of cutting are being carried on. The effect on log grade of the different logging methods is also being observed.

Small sawmills located in the vicinity make possible studies of lumber grade recovery from logs produced in selection cuttings on the Forest.

Financial aspects of the woods operations are studied carefully, and the various elements of cost and return analyzed. Stumpage rates on the Forest are adjusted to insure fair returns to the farmer-loggers.

G. Fundamental and scientific problems. Aside from the immediate practical problems which receive most of the attention of the Experiment Station staff, some time is also spent on the more fundamental and scientific problems underlying the practice of forestry. The relationship between the forest and the soil as first brought out in the intensive soil investigations made on the Experimental Forest is of importance and throws light on the management of the Forest. The continuous records and observations on the development of stands from saplings to mature trees furnish basic information on the development applicable to the forest growth of the entire hardwood region.

Demonstration of the Possibilities of Sustained Yield

Northern hardwoods grow slowly. It may take 80 to 100 years to grow even a small sawlog. Still it is possible to have an annual return from a forest provided that a variety of sizes and ages of trees are represented in the growing stock or forest capital.

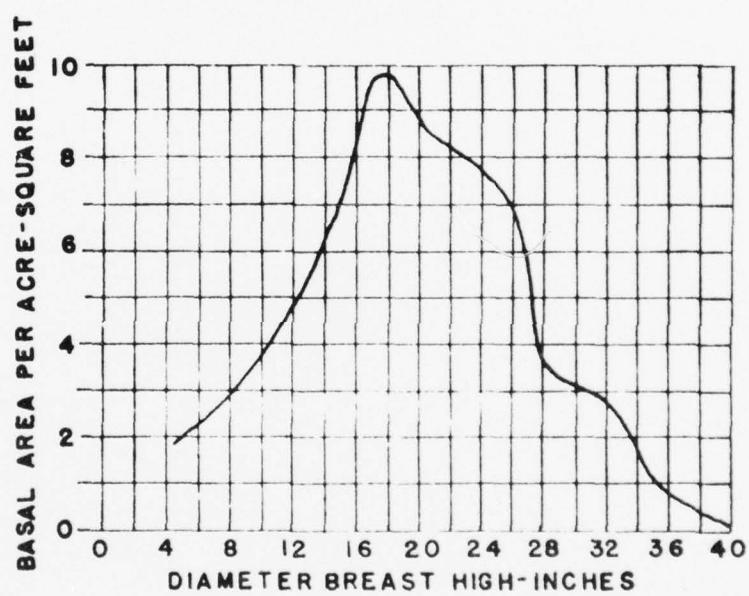
When the Upper Peninsula Experimental Forest was taken over it was essentially an old-growth forest. Over the forest as a whole a fairly good distribution of sizes and ages were present. (See chart) However, the stand was in general badly decadent. Decay was everywhere present and probably was increasing to such an extent that there was no net growth.

The first and obvious thing to do was to remove the worst of the defective trees in as short a time as possible. It was decided, therefore, to put into effect a light salvage cutting with the objective of covering the whole hardwood type within 10 years. Once the forest is put in growing condition it is estimated that the annual growth will be approximately 500,000 feet B.M., Scribner scale. The demonstration of sustained yield should be of primary interest to large timberland owners and to managers of public forests.

Maintenance of a Permanent Local Forest Community

In connection with the management of the Forest, every effort is being made to provide regular part-time employment for as many of the local farmers as possible. Timber sales are for the most part small and well distributed among the permanent residents of the community.

For example, during 1944, 51 workers representing 43 forest families worked a total of 4,800 days on the Forest, or 94 days per worker. In terms of cash wages, they received \$630 per worker, or \$750 per family. Although in normal years proceeds from such work might drop to \$400 or \$500 per family, the amount is still a very significant item in the farm family income.



REPRESENTATIVE STAND IN
NORTHERN HARDWOOD TYPE

Total basal area per acre = 153.9 sq. ft.
Basis - 24.6 acres of tally

GENERAL USE OF THE EXPERIMENTAL FOREST

The Experimental Forest is more than a scientific institution. It serves as a practical demonstration for the benefit of other forest owners. To see is to believe. There is no better way to convince others of the practical value of forest practice than to make them see the result for themselves. The value of the experimental tract for demonstration purposes is that a wide variety of conditions are represented on a compact and accessible area with every operation carefully measured, controlled, checked, and recorded.

It is a woods laboratory where investigations of plant life may be studied under natural conditions.

It is a scientific center in the forest for students of plant life and forestry.

It is a meeting place where Boy Scouts, Four-H Clubs, and other boys' and girls' clubs, their members the future citizens of the Upper Peninsula, can be shown what forestry means.

The Experimental Forest is an economic asset to the community. The logging operations, planting, and improvements carried on there provide a small cash income for many nearby farmers. It is a convenient and cheap source of fuelwood for others. Although these advantages are local, they are of importance as an example of what every managed forest can mean to a community.

LOOKING TO THE FUTURE

The work of the Experiment Station has hardly begun. While the investigations under way are already yielding valuable results, their true value is increasing as time goes on, because forest experiments are long-time studies that must be carried on for many years before final conclusions are reached. The demonstration value of the Forest will obviously increase as more experimental operations are carried on and as the results of different cuttings and other treatments become more pronounced.

Forestry, in its broadest aspect including all phases of forest production and forest use, is bound to occupy a leading place in the future development of the Upper Peninsula of Michigan and the northern Lake States in general, as very large areas in this region are best suited to that purpose. Forest lands in Michigan are being developed either as timber-producing units or as hunting reserves, parks, and recreational areas by all classes of owners -- the Federal government, the State, counties, cities, schools, lumber and paper companies, and various others. The Forest Experiment Station must lead the way and furnish a basis of sound scientific facts for the development of the forest lands for these different purposes.